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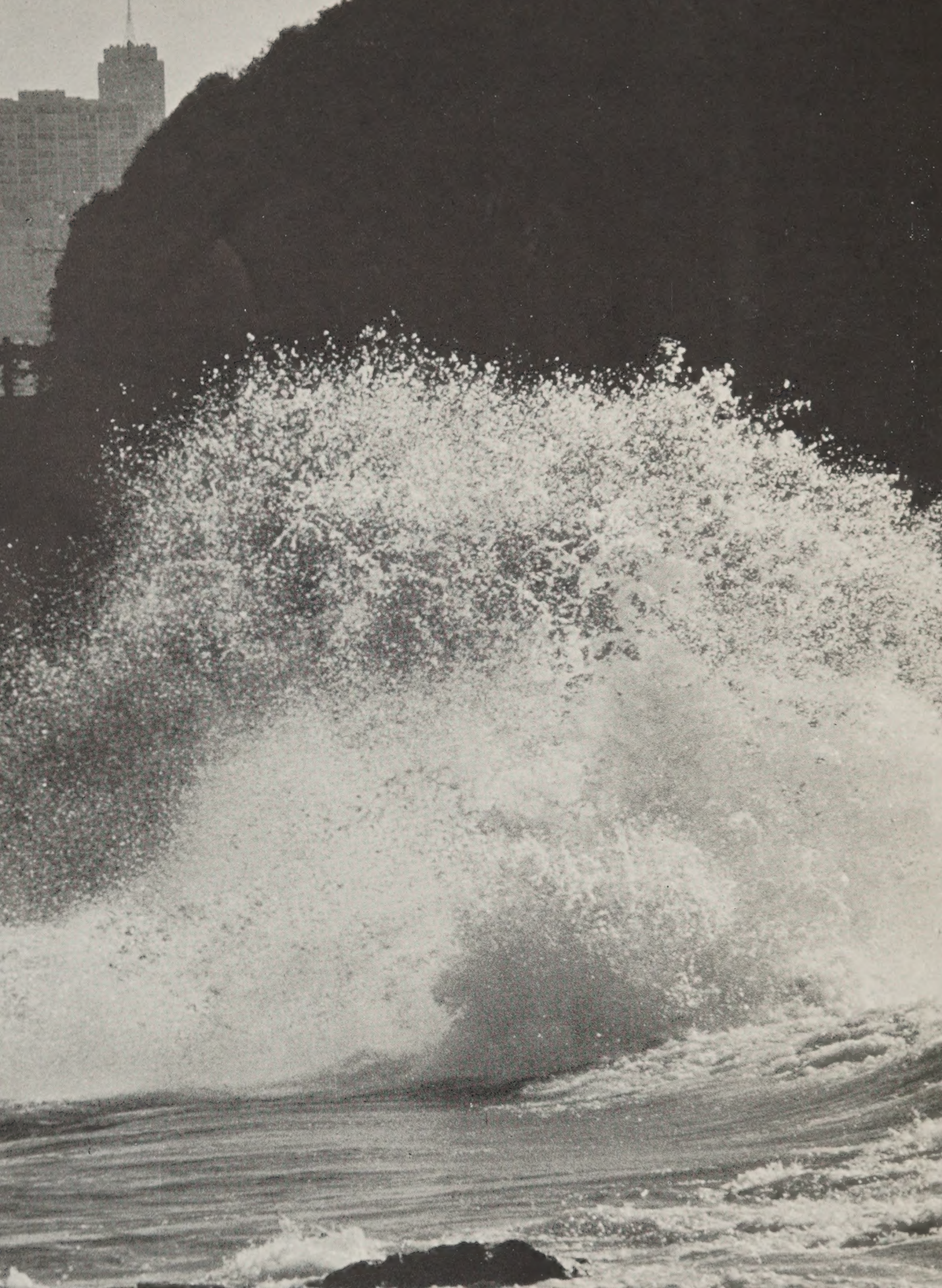
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San Francisco
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Commission

January, 1969



Letter of Transmittal

STATE OF CALIFORNIA

RONALD REAGAN, Governor

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

507 POLK STREET, ROOM 320
SAN FRANCISCO, CALIFORNIA 94102
PHONE: 557-3686



MELVIN B. LANE
Chairman

WILLIAM D. EVERS
Vice-Chairman

JOSEPH E. BODOVITZ
Executive Director

January 6, 1969

TO GOVERNOR RONALD REAGAN
AND MEMBERS OF THE CALIFORNIA LEGISLATURE:

We submit herewith our final report -- and our Plan for San Francisco Bay -- as required by the McAteer-Petris Act (Chapter 1162, Statutes of 1965).

As directed by the Act, we have made a detailed study of the Bay and we have used this study to prepare "a comprehensive and enforceable plan for the conservation of the water of San Francisco Bay and the development of its shoreline."

Since September, 1965, we have been meeting twice a month to complete our studies and our plan. We have published reports on 23 different aspects of the Bay, on such varied subjects as the importance of marshlands and the needs of waterfront industry. In our work, we have had the assistance of our own staff, the staffs of many other governmental agencies, and specialists in such fields as engineering, biology, governmental finance, meteorology, landscape architecture, urban design, industrial development, recreational planning, real estate appraisal, geology, and soils engineering.

As provided by the McAteer-Petris Act, the existence of our Commission will terminate on the 90th day after final adjournment of the 1969 Legislative Session. We therefore respectfully recommend that legislation be passed during the 1969 Session, as proposed in this report, so that there will be no lapse in the efforts begun by the State in 1965 to protect and enhance San Francisco Bay.

Sincerely,

A handwritten signature in dark ink, appearing to read "Melvin B. Lane".
MELVIN B. LANE
Chairman

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In memory of the late Senator
J Eugene McAteer, a leader in
efforts to plan for the conserva-
tion of San Francisco Bay and
the development of its shoreline.

Commissioners, 1965-1969¹

Martin Meyerson, Acting Chancellor of the University of California, Berkeley (appointed by the Governor)

* **Melville Owen**, attorney, Kentfield (appointed by the Governor)

* **Edward J. Slevin**, public relations consultant, San Rafael (appointed by the Senate Rules Committee)

John H. Sutter, attorney, Oakland (appointed by the Governor)

* **Mrs. Dean A. Watkins**, civic leader, Portola Valley (appointed by the Governor)

FEDERAL REPRESENTATIVES

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STATE REPRESENTATIVES

* **Supervisor Peter Behr** of Marin County, representing the Bay Area Transportation Study Commission

Robert B. Bradford, Administrator of the State Transportation Agency

* **Grant A. Burton**, representing the San Francisco Bay Regional Water Quality Control Board

Leslie A. Carbert, State Planning Officer

Controller Alan Cranston, representing the State Lands Commission

Hugo Fisher, Administrator of the State Resources Agency

* **Controller Houston I. Flournoy**, representing the State Lands Commission

* **Robert L. Harkness**, State Planning Officer

* **Norman B. Livermore, Jr.**, Administrator of the State Resources Agency

* **Gordon C. Luce**, Administrator of the State Transportation Agency

Mayor J. D. Maltester of San Leandro, representing the Bay Area Transportation Study Commission

COUNTY REPRESENTATIVES

(appointed by County Boards of Supervisors)

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* **Hans A. Feibusch**, consulting engineer, San Francisco

Supervisor James V. Fitzgerald of San Mateo County

Supervisor A. C. Harrison of San Mateo County

Supervisor James P. Kenny of Contra Costa County

* **Supervisor James E. Moriarty** of Contra Costa County

* **Supervisor Charles A. Quinn** of Santa Clara County

* **Supervisor Emanuel P. Razeto** of Alameda County

* **Supervisor Robert B. St. Clair** of San Mateo County

* **Supervisor Leigh S. Shoemaker** of Sonoma County

* **Dr. William F. Upton**, member of the Marin County Planning Commission

* **Alfred L. Wanger**, industrial property manager, Solano County

* **Supervisor Henry M. Wigger** of Napa County

CITY REPRESENTATIVES

(appointed by the Association of Bay Area Governments)

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* **Mayor Ronald R. James** of San Jose

* **Councilman Bernice Hubbard May** of Berkeley

* **Thomas J. Mellon**, Chief Administrative Officer of San Francisco

Mayor Garland Oliver of Alviso

Mayor James P. Thurber, Jr., of Los Altos

Mayor Michael Wornum of Mill Valley

LEGISLATORS

Assemblyman John T. Knox of Richmond

Senator J Eugene McAteer of San Francisco

* **Senator John F. McCarthy** of San Rafael

* **Assemblyman John J. Miller** of Oakland

Senator (former Assemblyman) Nicholas C. Petris of Oakland

PUBLIC REPRESENTATIVES

* **Melvin B. Lane**, Executive Vice President of Sunset Magazine, Menlo Park (appointed by the Governor), CHAIRMAN

* **William D. Evers**, attorney, San Francisco (appointed by the Governor), VICE CHAIRMAN

Mrs. Morse Erskine, civic leader, San Francisco (appointed by the Governor), VICE CHAIRMAN

* **Harry A. Bruno**, architect, Oakland (appointed by the Governor)

Joseph L. Eichler, home builder, San Francisco (appointed by the Governor)

* **Louis Ets-Hokin**, Chairman of the Board of Ets-Hokin Corporation, San Francisco (Appointed by the Speaker of the Assembly)

Eugene L. Friend, businessman, San Francisco (appointed by the Senate Rules Committee)

Mrs. Bernice Hubbard May, member of the Berkeley City Council, Berkeley (appointed by the Governor)

¹ This list includes all Commissioners who served at any time between 1965 and 1969. Members of the Commission as of the date of completion of this report are indicated by an asterisk opposite their name. Identification of each Commissioner is as of his period of service on the Commission.

Proxies for Commissioners, 1965-1969¹

Supervisor T. J. Coll of Contra Costa County

* **Herbert G. Crowle**, Public Works Director of Alameda County

Supervisor Howard H. Dickenson of Napa County

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Myron J. Elkins, administrative assistant to the State Planning Officer

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John Erreca, Director of the State Department of Public Works

* **Mrs. Morse Erskine**, civic leader, San Francisco

* **Councilman Bernard Esser** of Millbrae

Curtiss M. Everts, Regional Program Director, Office of Solid Wastes, U. S. Public Health Service

* **Mrs. John A. Gast**, former Belmont planning commissioner

William F. Grader, assistant to the Administrator of the State Resources Agency

Joel Gustafson, Professor of Biology, San Francisco State College

* **Ellis M. Harris**, food broker, San Francisco

* **Charles W. Henderson**, vice president of the Ets-Hokin Corporation

* **F. J. Hortig**, Executive Officer of the State Lands Division

Mrs. Ralph N. Jacobson, chairman of the Council for Governmental Responsibility, Hillsborough

* **G. Paul Jones**, manager of the the Marin County Mosquito Abatement District

* **Dr. David C. Joseph**, Executive Officer of the North Coast Regional Water Quality Control Board

* **Michael Kahl**, administrative assistant to Senator John F. McCarthy

* **George R. Kane**, publisher of the Los Gatos Times

* **Donald M. Keagy**, Acting Regional Representative of the National Center for Urban and Industrial Health, U. S. Public Health Service

Mrs. Clark Kerr, Vice President of the Save San Francisco Bay Association

Dr. Eugene C. Lee, Vice President-Executive Assistant of the University of California, Berkeley

Daniel M. Luevano, Director of the Joint Committee on Bay Area Regional Organization

Alan S. Maremont, Director of the San Francisco Bay Area Office of the Kate Maremont Foundation

Councilman Bernice Hubbard May of Berkeley

* **Frank E. McClure**, structural engineer, Oakland

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* **Councilman Norman Y. Mineta** of San Jose

* **Hugh E. Mulholland**, Deputy Director of the State Department of Public Works

Councilman David M. Pierce of Richmond

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* **Victor W. Sauer**, Public Works Director of Contra Costa County

William B. Schreeder, Deputy Regional Program Director, Department of Health, Education, and Welfare

Ellis W. Shamp, director and past president of the Associated Sportsmen of California

* **Robert Lee Sims**, Vice President, Secretary, and Treasurer of the Lakeside Corporation and Lakeside Foundation

* **George E. Slevin**, public relations consultant, San Rafael

Bernard J. Smith, Engineering Division, U. S. Army Corps of Engineers

John A. Stirton, Engineering Division, U. S. Army Corps of Engineers

* **S. Myron Tatarian**, Public Works Director of San Francisco

Supervisor Ignazio A. Vella of Sonoma County

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* **Supervisor Dewey K. Andersen** of Napa County

* **David Balmer**, Solano County Administrator

* **Edmond C. Baume**, administrative assistant to the State Planning Officer

* **Mrs. David D. Boyden**, civic leader, Berkeley

* **Mrs. Arthur F. Bridge**, civic leader, Belvedere

Mayor Edward R. Burton of San Carlos

Councilman Victor Calvo of Mountain View

¹ This list includes persons who served as Proxy members of the Commission at any time between 1965 and 1969. Proxies as of the date of completion of this report are indicated by an asterisk opposite their name. Identification of each Proxy is as of his period of service on the Commission.

BCDC Advisory Committee

George M. Dean, Vice President (retired) of the Pacific Telephone and Telegraph Company, Hillsborough, CHAIRMAN

Herbert Blumer, Professor of Sociology at the University of California, Berkeley

Henry Bostwick, Jr., Executive Vice President and General Manager of the San Mateo County Development Association, Inc., San Mateo

Richard M. Boswell, secretary of the Pacific Inter-Club Yacht Association, El Cerrito

Leslie E. Carbert, tax economist for Pacific Gas and Electric Co. and former State Planning Officer, San Francisco

James K. Carr, General Manager of the San Francisco Public Utilities Commission, which operates San Francisco International Airport, San Francisco

Eric E. Duckstad, Director of Regional and Urban Studies at Stanford Research Institute, Menlo Park

Mrs. Ward Duffy, past President of the Bay Area Leagues of Women Voters, San Francisco

George O. Gates, Assistant Chief Geologist, U. S. Geological Survey, Menlo Park

Mrs. P. K. Gilman, Vice President of the Marin Conservation League, Larkspur

John S. Harnett, General Manager of the East Bay Municipal Utility District and former San Francisco District Engineer, U. S. Army Corps of Engineers, Oakland

John P. Harville, Director of Moss Landing Marine Laboratories, Moss Landing

Ralph Jones, landscape architect Oakland

Carl B. Metoyer, attorney, Oakland

Ben E. Nutter, Executive Director of the Port of Oakland

Burton Rockwell, architect, San Francisco

Ralph Shaw, Director of San Mateo County Department of Parks and Recreation, Redwood City

Julius von Nostitz, President of the California Wildlife Federation, San Francisco

Robert W. Walker, Vice President-Executive Representative of the Atchison, Topeka and Santa Fe Railway System, owners of large tideland areas, San Francisco

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Executive Director

Alvin H. Baum, Jr.
Deputy Executive Director

William E. Chandler
Assistant Executive Director

Legal Advisor: E. Clement Shute
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Staff Engineer

Peter A. Stromberg
Assistant Planner

Marguerite Dorsey²
Graphic Artist

Elinor H. Rhodes
Graphic Artist

Mary Wong
Planning Secretary

¹ Resigned January 1967

² Resigned March 1968

Principal BCDC Consultants

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James W. Cutter, commercial and industrial cartographer, Los Altos

Robert E. Grunwald of Grunwald, Crawford & Associates, resource planners, Hanford

Lawrence Halprin and Associates, environmental planners, San Francisco

H. Thomas Harvey, Professor of Biology, San Jose State College, author of BCDC report, "Some Ecological Aspects of San Francisco Bay," and ecological consultant to the Commission

I. Michael Heyman, Professor of Law, University of California, Berkeley, author of BCDC report, "Regulation—Legal Questions"

Maury Homes, real property appraiser, Oakland, author of BCDC report, "Costs of Acquiring Bay Lands"

Richard W. Karn of Bissell & Karn, civil engineers, San Leandro, author of BCDC report, "Review of Barrier Proposals for San Francisco Bay," and engineering consultant to the Commission

Albert Miller, Professor of Meteorology, San Jose State College, author of BCDC report, "Smog and Weather: The Effect of San Francisco Bay on the Bay Area Climate"

Mrs. Dorothy A. Muncy, city planner, specialist in industrial planning, Arlington, Virginia, author of BCDC report, "Waterfront Industry Around San Francisco Bay"

Okamoto/Liskamm, planners and architects, San Francisco, authors of BCDC report, "Appearance and Design: Principles for Design and Development of San Francisco Bay"

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Barbara Stauffacher, Graphic Designer, San Francisco

Karl V. Steinbrugge, structural engineer, San Francisco, author of BCDC report, "Seismic Risk to Buildings and Structures on Filled Lands in San Francisco Bay"

State of California:

Attorney General

Department of Fish and Game, which prepared BCDC report, "Preliminary Fish and Wildlife Plan for San Francisco Bay-Estuary"

Department of Parks and Recreation, which helped prepare BCDC report, "Recreation on and Around San Francisco Bay"

Division of Mines and Geology, which prepared BCDC report, "Geology of San Francisco Bay"

State Lands Commission, which furnished background material for BCDC report, "Ownership"



Part I Summary

Introduction

San Francisco Bay is an irreplaceable gift of nature that man can either abuse and ultimately destroy—or improve and protect for future generations.

The Bay Plan presented in this report recognizes that the Bay is a single body of water, in which changes affecting one part may also affect other parts, and that only on a regional basis can the Bay be protected and enhanced.

The Bay can serve human needs to a much greater degree than it does today. The Bay can play an increasing role as a major world port. Around its shores, many job-producing new industries can be developed. And new parks, marinas, beaches, and fishing piers can provide close-to-home recreation for the Bay Area's increasing population.

But the Bay must be protected from needless and gradual destruction. The Bay should no longer be treated as ordinary real estate, available to be filled with sand or dirt to create new land. Rather, the Bay should be regarded as the most valuable natural asset of the entire Bay region, a body of water that benefits not only the residents of the Bay Area but of all California and indeed the nation.

Adoption of the Plan presented in this report will guarantee to future generations their rightful heritage from the present generation: San Francisco Bay maintained and enhanced as a magnificent body of water that helps sustain the economy of the western United States, provides great opportunities for recreation, moderates the climate, combats air pollution, nourishes fish and wildfowl, affords scenic enjoyment, and in countless other ways helps to enrich man's life.

Major Conclusions and Policies

From its studies of San Francisco Bay, the Commission has concluded that:

1. The Bay. The Bay is a single body of water, and a Bay Plan can be effectively carried out only on a regional basis.

2. Uses of the Bay. The most important uses of the Bay are those providing substantial public benefits and treating the Bay as a body of water, not as real estate.

3. Uses of the Shoreline. All desirable, high-priority uses of the Bay and shoreline can be fully accommo-

dated without substantial Bay filling, and without loss of large natural resource areas. But shoreline areas suitable for priority uses—ports, water-related industry, airports, wildlife refuges, and water-related recreation—exist only in limited amount, and should be reserved for these purposes.

4. Justifiable Filling. Some Bay filling may be justified for purposes providing substantial public benefits if these same benefits could not be achieved equally well without filling. Substantial public benefits are provided by:

- a. Developing adequate port terminals, on a regional basis, to keep San Francisco Bay in the forefront of the world's great harbors during a period of rapid change in shipping technology.
- b. Developing adequate land for industries that require access to shipping channels for transportation of raw materials or manufactured products.
- c. Developing new recreational opportunities—shoreline parks, marinas, fishing piers, beaches, hiking and bicycling paths, and scenic drives.
- d. Developing expanded airport terminals and runways if regional studies demonstrate that there are no feasible sites for major airport development away from the Bay.
- e. Developing new freeway routes (with construction on pilings, not solid fill) if thorough study determines that no feasible alternatives are available.
- f. Developing new public access to the Bay and enhancing shoreline appearance—over and above that provided by other Bay Plan policies—through filling limited to Bay-related commercial recreation and public assembly.

5. Effects of Bay Filling. Bay filling should be limited to the purposes listed above, however, because any filling is harmful to the Bay, and thus to present and future generations of Bay Area residents. All Bay filling has one or more of the following harmful effects:

- a. Filling destroys the habitat of fish and wildlife. Future filling can disrupt the ecological balance in the Bay, which has already been damaged by past fills, and can endanger the very existence of

some species of birds and fish. The Bay, including open water, mudflats, and marshlands, is a complex biological system, in which micro-organisms, plants, fish, waterfowl, and shorebirds live in a delicate balance created by nature, and in which seemingly minor changes, such as a new fill or dredging project, may have far-reaching and sometimes highly destructive effects.

b. Filling almost always increases the danger of water pollution by reducing the ability of the Bay to assimilate the increasing quantities of liquid wastes being poured into it. Filling reduces both the surface area of the Bay and the volume of water in the Bay; this reduces the ability of the Bay to maintain adequate levels of oxygen in its waters, and also reduces the strength of the tides necessary to flush wastes from the Bay.

c. Filling reduces the air-conditioning effects of the Bay and increases the danger of air pollution in the Bay Area. Reducing the open water surface over which cool air can move in from the ocean will reduce the amount of this air reaching the Santa Clara Valley and the Carquinez Strait in the summer—and will increase the frequency and intensity of temperature-inversions, which trap air pollutants and thus cause an increase in smog in the Bay Area.

d. Indiscriminate filling will diminish the scenic beauty of the Bay.

6. Pressures to Fill. As the Bay Area's population increases, pressures to fill the Bay for many purposes will increase. New flat land will be sought for many urban uses because most, if not all, of the flat land in communities bordering the Bay is already in use—for residences, businesses, industries, airports, roadways, etc. Past diking and filling of tidelands and marshlands has already reduced the size of the Bay from about 680 square miles in area to little more than 400. Although some of this diked land remains, at least temporarily, as salt ponds or managed wetlands, it has nevertheless been removed from the tides of the Bay. The Bay is particularly vulnerable to diking and filling for two reasons:

a. The Bay is shallow. About two-thirds of it is less than 18 feet deep at low tide; in the South Bay and in San Pablo Bay, the depth of the water two or three miles offshore may, at low tide, be only five or six feet or even less.

b. Ownership of the Bay is divided. Private owners claim about 22 per cent of the Bay (including extensive holdings in the South Bay) as a result of sales by the State government 90 or more years ago. Cities and counties have received free grants of land from the State totaling about 23 per cent of the Bay. The State now owns only about 50 per cent of the Bay, and the Federal government owns about 5 per cent. The lands that are closest to shore, most shallow, and thus easiest to fill are held by either private owners or local governments that may wish to fill for various purposes irrespective of the effects of filling on the Bay as a whole.

7. Water Quality. Liquid wastes from many municipal, industrial, and agricultural sources are emptied into San Francisco Bay. Because of the work now under way by the San Francisco Bay Regional Water Quality Control Board, the Army Corps of Engineers, and the Bay-Delta Water Quality Control Program, the Bay Plan does not deal extensively with the problems of pollution control. But the entire Bay Plan is founded on the belief that water quality in San Francisco Bay can and will be maintained at levels sufficiently high to permit full public enjoyment and use of the Bay.

8. Fill Safety. Virtually all fills in San Francisco Bay are placed on top of Bay mud. The construction of buildings on such fills creates a greater number of potential hazards to life and property, during normal settling and during earthquakes, than does construction on rock or on dense, hard soil deposits. Adequate design measures can be taken, however, to reduce these potential hazards to acceptable levels.

The agency designated to carry out the Bay Plan should appoint a Fill Review Board, consisting of leading geologists, soils engineers, structural engineers, and architects, to (1) establish safety criteria for Bay fills and structures built on fills, and revise the criteria as necessary in the future; (2) review all except minor projects as to the adequacy of their safety provisions, and recommend changes if necessary; (3) develop an inspection system to insure placement of fills according to approved designs; and (4) gather and publish data developed from specific fill projects. This work would complement the functions of local building and planning departments, none of which are presently staffed to provide soils inspections.

Definitions

As used in this report, San Francisco Bay means all the open water and slough areas from the Golden Gate and the southern end of the Bay to the eastern end of Suisun Bay and Montezuma Slough (a line between Stake Point and Simmons Point, extended northeasterly to the mouth of Marshall Cut), including submerged lands (which are always under water), tidelands (which are covered and uncovered by the daily tides), and marshlands (which are between mean high tide and five feet above mean sea level).

As used in this report, shoreline areas or shoreline lands are the uplands bordering the Bay.

As used in this report, salt ponds are areas diked off from the Bay and used for making salt by solar evaporation, and managed wetlands are marshes diked off from the Bay and managed as wildfowl habitat (generally under the ownership of duck-hunting clubs).

Foundations of the Bay Plan

The Bay Plan was prepared during three years of study and public deliberation by the members of the San Francisco Bay Conservation and Development Commission. This report presents the two essential parts of the Bay Plan: the recommended policies to guide future uses of the Bay and shoreline, and the recommended maps that apply these policies to the present Bay and shoreline. (The Bay Plan also includes recommended procedures for amending the policies and maps in light of changing circumstances and new information in the future.)

In making its study of the Bay, the BCDC had the help of numerous consultants and received extensive and invaluable aid from city, county, state, and federal agencies, and from specialists on university faculties and on the staffs of business organizations. In addition, the Commission was assisted by an Advisory Committee, whose 19 members contributed greatly in the review of the Commission's work.

The Commission's study resulted in the publication of 23 volumes of technical reports. Summaries of the studies are printed as a supplement to this report, and the detailed reports are available in numerous public libraries and in the offices of the Commission.

Also printed as a supplement to this report is an analysis of the hazards of building on filled land (hazards during normal settling of fills and during earthquakes), and of the engineering steps necessary to reduce these risks to acceptable limits. This supplementary report was prepared by a Board of Consultants appointed by the BCDC and consisting of some of the Bay Area's leading geologists, structural engineers, architects, and civil engineers specializing in soil mechanics.

Major Plan Proposals

1. Port expansion should be planned for Benicia, Oakland, Redwood City, Richmond, and San Francisco.
2. Major shipping channels should be deepened from the Golden Gate to the Delta, and to Oakland, Redwood City, Richmond, and San Francisco.
3. Waterfront land now used by industries that require access to deep-water shipping should be continued in this use, and sufficient additional waterfront acreage should be reserved for future water-related industry.
4. New shoreline parks, beaches, marinas, fishing piers, scenic drives, and hiking or bicycling pathways should be provided in many areas. The Bay and its shoreline offer particularly important opportunities for recreational development in urban areas where large concentrations of people now live close to the water but are shut off from it. Highest priority should be given to recreational development in these areas, as an important means of helping immediately to relieve urban tensions.
5. Airports around the Bay serve the entire Bay Area, and future airport planning can be effective only on a regional basis. The Bay provides an open area for aircraft to take off and land without having to fly over densely-populated areas, and this is an excellent use of the water. But terminals and other airport facilities should be on existing land wherever feasible. Future airport development should be based on a regional airport plan, which should be prepared as soon as possible by a governmental agency with region-wide responsibilities for transportation planning. Studies leading to this airport plan should evaluate all reasonable alternatives for meeting the Bay Area's growing need for aviation facilities, and should specifically evaluate the needs of commercial, military, and general (small plane) aviation. Airport expansion or construction on Bay fill should be permitted only if no feasible alternatives are available.
6. Prime wildlife refuges in diked-off areas around the Bay should be maintained and several major additions should be made to the existing refuge system.
7. Private investment in shoreline development should be vigorously encouraged. For example, shoreline areas can be developed in many places for attractive, water-oriented housing.

Carrying out the Bay Plan

1. **General.** A governmental agency should be created or designated by the 1969 Legislature to carry out the Bay Plan. This Bay agency should be specifically authorized and directed to carry out the Plan, should be empowered to raise sufficient funds for this purpose, and should have the right to acquire Bay or shoreline land through negotiated purchase or through eminent domain if necessary. Preferably, the agency should be a limited regional government, concerned with more than one of the problems generally agreed to be of a regional nature in the Bay Area. If for any reason a limited regional government is not created in 1969, however, an agency should be created or designated with the single responsibility of carrying out the Bay Plan.

(The Commission's recommendations on governmental organization to carry out the Bay Plan, together with the Commission's studies of this matter, have been submitted to the Joint Legislative Committee on Bay Area Regional Organization.)

2. **Permits for Bay Filling and Dredging.** The agency designated to carry out the Bay Plan should be empowered to grant or deny permits for all Bay filling or dredging, in accordance with the standards in the Plan. Any public agency or owner of privately-held Bay property should be required to obtain a permit before proceeding with fill or dredging. (Although Federal agencies would not legally be subject to the jurisdiction of the future State-created Bay agency, it is Federal policy to conform generally to State laws and plans if they do not unduly interfere with national purposes or objectives, and Federal cooperation in carrying out the Bay Plan should thus be sought and expected.) For purposes of this Plan, fill should be defined to include earth or any other substance or material placed in the Bay including piers, pilings, and floating structures moored in the Bay for extended periods. Public hearings should be held on all permit applications except those of a minor nature. (This procedure is similar to the permit procedure that the BCDC has been administering since September, 1965, under the Government Code [Sections 66600-66653].)

3. **Permits for Shoreline Development.** The agency designated to carry out the Bay Plan should have limited jurisdiction over development in shoreline areas. This is necessary (1) to insure that prime shoreline sites are reserved for priority uses—ports, water-related industry, airports, wildlife refuges, and water-related recreation,

(2) to insure that public access to the Bay is provided to the maximum extent feasible, (3) to insure that if any salt ponds or managed wetlands are proposed for development, consideration is given to public purchase and return of these areas to the Bay, or alternatively, that any development is in accordance with the guidelines recommended in the Bay Plan, (4) to insure that shoreline areas not needed for priority use are developed in ways that do not adversely affect the Bay, and (5) to encourage attractive design of shoreline developments. The regional regulation of shoreline development should clearly be limited, and, in general, shoreline development should continue to be subject principally to local controls. The Bay agency should administer its shoreline jurisdiction through a permit system.

Costs of Carrying out the Plan

The Bay Plan proposes development of ports, water-related industry, airports, wildlife areas, and water-related recreation. Some of this development can and should be financed by private investment, and some by joint private-public efforts; but other types of development will depend on public funds.

Industrial growth along the shoreline will, over the next 50 years, require the private investment of many millions of dollars. Expansion of existing port and airport terminals, and creation of new ones, will require both public and private investment; these terminals generate revenues that can repay the private investment and at least part of the public investment, however.

Private financing of recreational development should be vigorously encouraged, but even with extensive private investment, substantial public funds will be needed if all the recreational development in the Bay Plan is to be provided. Public funds will also be required for additional wildlife refuges. The Bay Plan maps show some 5,800 additional waterfront acres as being of particular importance for recreational development, and 1,600 acres of new wildlife areas. No detailed appraisals of the value of this land have been made, but on the basis of county assessors' records, the purchase price could be estimated at \$30–50 million. If present inflationary trends continue, however, this cost would probably increase every year. (In addition to the funds necessary to buy land, money would also be needed to later develop beaches, parks, etc., on this land.)

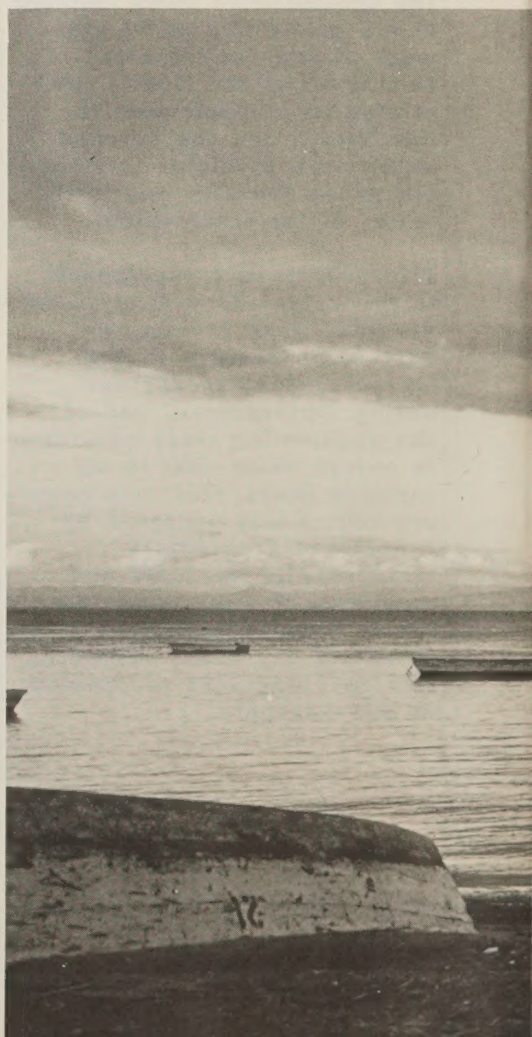
Carrying out the Plan will also require that administrative funds be provided for the Bay agency. An estimated \$400–500,000 per year would be

needed to pay for necessary staff to keep the Plan up to date, make engineering inspections, process permit applications, assist local governments in detailed shoreline planning, etc., and to pay for office expenses.

Further costs would be incurred if it were determined that private owners of parts of the Bay were to be paid for keeping their property as open water. The Bay Plan does not provide for such payments because many owners will be able to make economic use of their holdings under the Plan, and because many legal questions exist as to the rights of some owners to fill. The amount of money that would be required for compensation cannot be determined with any precision; estimates of the total value of all the privately-held property at the bottom of the Bay are as low as \$28.5 million and as high as \$285 million.

Conclusion

The Bay is a single physical mechanism in which actions affecting one part may also affect other parts. The Bay Plan provides a formula for developing the Bay and shoreline to their highest potential, while protecting the Bay as an irreplaceable natural resource. A governmental agency should be created or designated by the 1969 Legislature to carry out the Bay Plan.







Part II

Objectives

Objective 1

Protect the Bay as a great natural resource for the benefit of present and future generations.

Objective 2

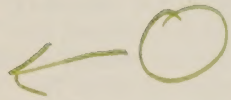
Develop the Bay and its shoreline to their highest potential with a minimum of Bay filling.



Part III

The Bay as a Resource:

Findings and Policies



Fish and Wildlife

Findings and policies concerning Fish and Wildlife In the Bay

Findings

a. San Francisco Bay is by far the largest estuary along California's long coastline. It is an essential resting place, feeding area, and wintering ground for millions of birds on the Pacific Flyway from Canada to Mexico. Nearly one hundred species of fish are also supported by the estuarine environment that includes marshlands, mudflats, salt production lands, and open water.

b. Human benefit from the fish and wildlife of the Bay includes food, economic gain, recreation, scientific research, education, and an environment for living. No comprehensive estimate of the value of fish and wildlife for these purposes is available, but such value can only increase unless man diminishes the Bay. In future decades the Bay may become of inestimable additional value as a fish and marine plant "farm," augmenting the nation's and the world's food resources for a rapidly-growing population.

c. Maintaining fish and wildlife depends upon availability of: (1) sufficient oxygen in the Bay waters, (2) adequate amounts of the proper foods, (3) sufficient shelter space, and (4) proper temperature, salt content, and velocity of the water. Requirements vary according to the species of fish and wildlife. Maintenance of these habitat requirements is essential to insure for present and future generations of Californians the benefit of fish and wildlife in the Bay. The key elements of the Bay fish and wildlife habitat are: marshes and mudflats, total water volume and total surface area of the Bay, good water circulation, and some fresh water inflow.

d. Plan Map 1, Natural Resources of the Bay, indicates the shoreline areas of greatest value for shore birds and water fowl. All parts of San Francisco Bay are assumed to be important for the perpetuation of fish and other marine life because any reduction of habitat reduces the marine population in some measure.

Policies

1. The benefits of fish and wildlife in the Bay should be insured for present

and future generations of Californians. Therefore, to the greatest extent feasible, the remaining marshes and mudflats around the Bay, the remaining water volume and surface area of the Bay, and adequate fresh water inflow into the Bay should be maintained.

2. Specific habitats that are needed to prevent the extinction of any species, or to maintain or increase any species that would provide substantial public benefits, should be protected, whether in the Bay or on the shoreline behind dikes. Such areas on the shoreline are designated as Wildlife Areas on the Plan maps.

Water Pollution

Findings and policies concerning Water Pollution In the Bay

Findings

a. San Francisco Bay receives a variety of municipal, industrial, and agricultural wastes from sources throughout its tributary drainage area. Pollution occurs when waste discharges cause water quality conditions that damage or destroy varied uses of the Bay. Such conditions can result from toxic (poisonous) substances, from residues that unduly stimulate organic growth in the Bay, and from sewage that consumes oxygen in the water as it disintegrates. Polluted waters may be unsafe for human contact or use, offensive to the senses, damaging or lethal to marine life, and even unsuitable for industrial use.

b. Compared to rivers and estuaries in other parts of the country, San Francisco Bay is relatively unpolluted. In recent years, extensive improvements in the treatment of industrial and municipal wastes have greatly reduced the pollution that once existed in the Bay. But some parts, especially in the South Bay, are still polluted at certain times of the year. As long as the Bay continues to receive wastes from an expanding population and industry, there must be constant improvement in waste management to upgrade presently polluted areas and prevent pollution problems in the future.

c. While waste disposal poses a continuing threat to water quality in the Bay, this use of Bay waters will continue for some time. Pollution of Bay waters from these wastes can be prevented by: (1) transporting wastes directly to the ocean (but without allowing waste discharges to damage the ocean's marine life); (2) prohibiting the discharge into the Bay of toxic wastes (poisons) that do not break down; (3) adequate treatment of wastes before discharge into the Bay; and (4) natural breakdown of any biodegradable wastes placed in the Bay, which can be encouraged by maintaining adequate flushing action and an adequate supply of dissolved oxygen in the Bay.

d. Key elements that affect flushing and the supply of dissolved oxygen are (1) the **volume** of water flowing in and out with the tides (and fresh water flowing into the Bay), (2) the

temperature of Bay waters, and (3) the rates of **oxygen interchange** at the surface of the Bay, including the tidal flats.

e. Several governmental programs are now seeking to determine the best methods of controlling water quality and preventing water pollution in the Bay. The San Francisco Bay Regional Water Quality Control Board has set water quality limits and time schedules for treatment facilities, so as to protect and enhance designated beneficial water uses of the Bay. The State's Bay-Delta Water Quality Control Program will present in early 1969 its long-range plan for preventing Bay pollution. And the State Water Resources Control Board is studying the California laws on water quality control to determine whether they should be strengthened.

Policies

1. To the greatest extent feasible, the remaining marshes and mudflats around the Bay, the remaining water volume and surface area of the Bay, and fresh water inflow into the Bay should be maintained.

2. Water quality in all parts of the Bay should be sufficiently high to permit water contact sports and to provide a suitable habitat for all indigenous and desirable forms of aquatic life. It is assumed that this will be achieved, in time, as the result of measures taken in response to requirements and enforcement proceedings of the Regional Water Quality Control Board, and measures resulting from current governmental studies. (Because of the work of these agencies, this Commission has not dealt extensively with the problem of pollution control. But the entire Bay Plan is founded on the belief that water quality in San Francisco Bay can and will be maintained at levels sufficiently high to permit full public enjoyment and use of the Bay.)

3. The water quality laws and practices should insure that no project is built within the watershed of San Francisco Bay unless its liquid wastes will be treated, on the premises or in a public treatment plant having sufficient capacity, so that the effluent would not cause delay in compliance with applicable water quality standards anywhere in the Bay.

Smog and Weather

Findings and policies concerning Effect of the Bay on Smog and Weather

Findings

a. The Bay plays a significant role in determining the climate of the Bay Area.

b. The waters of the Bay maintain a relatively constant temperature, and this helps to moderate extremes of heat and cold in surrounding areas. The Bay surface provides a cool pathway for summertime ocean winds, enabling them to help cool areas at the "ends" of the Bay (the Santa Clara Valley and the Carquinez Strait areas).

c. Present research indicates that filling a substantial part of the Bay—as much as 25 per cent—would cause (1) higher summertime temperatures and reduced rainfall in the Santa Clara Valley and the Carquinez Strait-Suisun Bay area; and (2) increases in the frequency and thickness of both fog and smog in the Bay Area. Converting Bay surface to land would increase smog-producing temperature inversions in the Bay Area; in addition, the new land would probably be used for smog-producing concentrations of urban developments, including automobiles.

Policies

1. To the greatest extent feasible, the remaining water volume and surface area of the Bay should be maintained.

Water Surface Area and Volume

Findings and policies concerning Water Surface Area and Volume

Findings

a. Dissolved oxygen is needed to support marine life and to help break down pollutants in the water. The amount of oxygen in the Bay is largely determined by the surface area of the Bay because primary sources of oxygen are: (1) churning waves that trap oxygen from the air, (2) the water surface, which absorbs oxygen from the air, and (3) the exposed mudflats, which both produce and absorb oxygen while the tide is out and transfer it to the water when the tide comes in.

b. Water circulation might be greatly improved by some of the major barrier proposals that have been made for the Bay. But barriers affect—for better or for worse—the appearance and ecology of the Bay, sedimentation, flood control, and existing and proposed uses of the shores of the Bay. They are also very costly. For all barrier proposals fully evaluated thus far, disadvantages outweigh advantages.

c. About 40 per cent of the original surface area of the Bay has been diked off or filled in since 1850. Because this has involved some of the most effective oxygenation areas, the ability of the Bay to take up oxygen has been sharply reduced.

d. The dissolved oxygen that is absorbed at the Bay surface or from the mudflats must be transmitted to the deeper waters by mixing of the water. The necessary mixing is accomplished by tidal interchange, by fresh water inflow from tributaries, and by circulation resulting from wind action upon the surface of the Bay. The strength of tidal flow and water circulation are greatly affected by the shape of the Bay bottom and the shoreline; fills, dikes, and piers can speed or retard water circulation, depending upon both the water circulation pattern in the affected area and the shape of the fill, dike, or pier.

Policies

1. The surface area of the Bay and the total volume of water should be kept as large as possible in order to maximize active oxygen interchange,

vigorous circulation, and effective tidal action. Filling and diking that reduce surface area and water volume should therefore be allowed only for purposes providing substantial public benefits and only if there is no reasonable alternative.

2. Water circulation in the Bay should be maintained, and improved as much as possible. Any proposed fills, dikes, or piers should be thoroughly evaluated to determine their effects upon water circulation and then modified as necessary to improve circulation or at least to minimize any harmful effects.

3. Because further study is needed before any barrier proposal to improve water circulation can be considered acceptable, the Bay Plan does not include any barriers. Before any proposal for a barrier is adopted in the future, the agency carrying out the Bay Plan will be required to replan all of the affected shoreline and water area.

Marshes and Mudflats

Findings and policies concerning Marshes and Mudflats Around the Bay

Findings

a. Salt marshes are extraordinarily fertile. Living marsh plants fix the energy of sunlight into their tissues through photosynthesis, and expel oxygen into the surrounding environment. One type of marsh plant, cord grass, has seven times the energy-generating capacity or food value of an equal acreage of wheat.

b. Large numbers of birds, including ducks and geese, come to the marshes to feed on the lush vegetation or on the brackish-water animals that thrive there. Their wastes, together with the decomposition products of plant decay and other elements of the complex food web, contribute nutrients from the marshes to the mudflats and the shallows of the Bay margin, supporting a vast marine-life nursery.

c. Most marine life in the Bay either depends directly on the marshes and mudflats for its sustenance or indirectly depends upon them by feeding upon other marine life so nourished. Shore birds depend upon the marshes and mudflats for both food and shelter.

d. Algae on the mudflats, exposed to abundant light alternating with abundant water, produce and expel oxygen into the water and into the air. This is an important source of oxygen that water must have both to support marine life and to combat water pollution.

e. The marshlands bordering the Bay now total about 75 square miles. In 1850, before diking and filling had been begun, marshlands covered some 300 square miles.

Policies

1. Marshes and mudflats should be maintained to the fullest possible extent to conserve fish and wildlife and to abate air and water pollution. Filling and diking that eliminate marshes and mudflats should therefore be allowed only for purposes providing substantial public benefits and only if there is no reasonable alternative. Marshes and mudflats are an integral part of the Bay tidal system and therefore should be protected in the same manner as open water areas.

2. Any proposed fills, dikes, or piers should be thoroughly evaluated to determine their effects on marshes and mudflats, and then modified as necessary to minimize any harmful effects.

3. To offset possible additional losses of marshes due to necessary filling and to augment the present marshes, (a) former marshes should be restored when possible through removal of existing dikes, (b) in areas selected on the basis of competent ecological study, some new marshes should be created through carefully placed lifts of dredged spoils, and (c) the quality of existing marshes should be improved by appropriate measures whenever possible.

Fresh Water Inflow

Findings and policies concerning Fresh Water Inflow Into the Bay

Findings

a. Fresh water carries about 20 to 30 per cent more dissolved oxygen than salt water. Fresh water, from tributaries around the Bay and especially from the Delta, is an important (but not the major) source of the oxygen necessary in the waters of the Bay to support marine life and to abate pollution.

b. The fresh water flow from the Sacramento and San Joaquin Rivers assists in flushing the northern parts of the Bay system, particularly during the spring when the snows melt in the Sierra.

c. The waters of the Bay provide a gradual change from the salt of the ocean to the fresh flow of the Sacramento and San Joaquin Rivers. This gradual change appears necessary for the survival of anadromous fish such as king salmon, steelhead, striped bass and American shad as they progress upstream toward their spawning grounds, and for the survival of their fingerlings as they descend to salt water. An abrupt change from salt to fresh water would probably end the anadromous fish runs.

d. The State Water Project, which will transport water from northern California to the central and southern parts of the State, may divert from the Bay as much as 80 per cent of the present flow in the Sacramento and San Joaquin Rivers. Many studies are under way or planned by Federal and State agencies to determine whether this diversion will adversely affect the Bay. Strong arguments have been made that the diversion will be harmful, and strong arguments have been made that the effects will be minimal.

Policies

1. If conclusive evaluations determine there will be substantial damage to the oxygen content or flushing of the Bay or to marine life in the Bay and Delta resulting from diversion of fresh water inflow into the Bay, appropriate corrective measures should be taken by the State Water Resources Control Board or other governmental agencies.

Dredging

Findings and policies concerning Dredging In the Bay

Findings

a. Much of the Bay bottom is covered with sediment—silt, sand, and clay—that has been carried by tributaries from dry land upstream. Sediment continues to flow into the Bay at the rate of about 6 million cubic yards a year; this amount is expected to decline, however, because of improved soil conservation programs and the diversion of silt-carrying waters from the Delta and Bay to other parts of the State. Only 30 per cent of the sediment entering the Bay is carried out the Golden Gate by the tides. The remainder settles to the bottom of the Bay, but may be picked up again by changing currents and carried to other parts of the Bay. Eventually, much of the sediment lodges in harbors and shipping channels from which it must be dredged at considerable cost.

b. Dredged mud is sometimes used as a fill material, and occasionally some is barged out to sea; but most often, the sediment is simply dumped in a part of the Bay where it is expected to cause as little harm as possible. Even at the best of these dumping grounds, near Alcatraz Island, only 47 per cent of the sediment is carried out to sea by the tides; at the Yerba Buena Island dumping area, only 30 per cent is carried out the Golden Gate; and at the dumping area in Carquinez Strait, probably less than 5 per cent ever reaches the ocean. The remaining sediment is simply recirculated in the Bay by the tides, and eventually settles to the bottom where it may have to be dredged again.

c. Dredged spoils dumped at sea could return to the Bay with tidal currents or could cause local damage to marine organisms or beaches near the dumping site. These conditions are capable of being analyzed prior to dumping at sea.

d. To reduce the cost of dredging harbors and navigation channels, sedimentation resulting from upstream erosion and redumping of dredged materials should be reduced as much as possible.

e. Underground fresh water supplies are an important supplement to surface water now brought into the Bay Area by aqueduct from mountain reservoirs. Deep dredging of Bay mud, or excavation for tunnels or bridge piers,

could strip the "cover" from the top of a fresh water reservoir under the Bay, allowing the salt water to contaminate the fresh water, or allowing the fresh water (if artesian) to escape in large quantities and thus cause land to sink. The precise location of ground water reservoirs under the Bay is not yet well known, however.

Policies

1. To prevent sedimentation resulting from dredging projects, mud from future dredging should be disposed of in one of the following ways: (a) placement on dry land, (b) placement as fill in approved fill projects, (c) barging or piping to suitable disposal sites in the ocean, or (d) if no other alternative is feasible, dumping in designated parts of the Bay where the maximum possible amount will be carried out the Golden Gate on the ebb tides; areas should be designated for this purpose upon approval by both the Bay agency and the Army Corps of Engineers. This policy is intended to apply as soon as possible to all dredging in the Bay, whether to create new channels or to maintain existing ones, but it is recognized that Federally-assisted maintenance dredging projects under way as of January 1, 1969, may require discharge of spoils in open waters of the Bay where relatively little of the dredged material is carried out to sea.

2. Vigorous efforts should be made to find methods of spoils disposal that will provide for construction of vitally-needed shipping channels, such as the John F. Baldwin Ship Channel from the Golden Gate to the Delta, while at the same time protecting the Bay from unnecessary filling solely to dispose of dredged mud.

3. Pending the completion of studies into the feasibility of new or improved methods of spoils disposal, complete compliance with the spoils disposal policy will not be immediately possible. Additional areas for spoils disposal may thus be needed within the Bay system, for maintenance dredging as well as for new channels for shipping or for pleasure boating, but disposal areas should be selected with due consideration as to which feasible disposal methods will be least harmful to the ecology of the Bay. In no case, however, should spoil be used to create artificial islands in the Bay unless competent studies demonstrate that these fill islands would have no harmful effect on water quality or on air quality.

4. All proposed channels should be carefully designed so as not to

undermine the stability of any adjacent dikes and fills.

5. The Bay agency should encourage increased efforts by soil conservation districts and public works agencies in the 50,000-square-mile tributary area to continuously reduce soil erosion as much as possible.

6. To protect underground fresh water reservoirs (aquifers), (a) all proposals for dredging or construction work that could penetrate the mud "cover" should be reviewed by the Regional Water Quality Control Board and the State Department of Water Resources, and (b) dredging or construction work should not be permitted that might reasonably be expected to damage an underground water reservoir. Applicants for permission to dredge should be required to provide additional data on ground water conditions in the area of construction to the extent necessary and reasonable in relation to the proposed project.

Shell Deposits

Findings and policies concerning Shell Deposits In the Bay

Findings

a. Oyster shells are dredged from the Bay floor primarily for use as lime in the production of cement. A small portion of the shells are used as soil conditioner, as cattle feed, and as poultry grit by local poultry and egg producers.

b. The shell deposits are an important mineral resource because the other principal source of lime, limestone, is more distantly located in Santa Clara, Santa Cruz, and San Benito Counties to the south. Cement is expensive to transport over great distances, so a nearby source of lime is important to the Bay Area economy.

Policies

1. Filling or diking that adversely affect known shell deposits, illustrated in Plan Map 1, Natural Resources of the Bay, should be allowed only for purposes providing more public benefit than the availability of the shells.



Part IV Development of the Bay and Shoreline: Findings and Policies

Economic and Population Growth

Findings and policies concerning Economic and Population Growth

Findings

a. Estimates of population and economic growth are important in developing predictions of future demands on the Bay—uses of the Bay for recreation, for example, and uses of the waterfront for industry.

Policies

1. In preparing the Bay Plan, preliminary estimates of total population for the nine-county Bay Area published by the Bay Area Transportation Study Commission in April, 1968, have been used. Middle range estimates (comparable to California Department of Finance projections) were selected: 6,200,000 in 1980 and 7,560,000 in 1990. By extension of the BATSC data, a total population of 10,800,000 was estimated for 2020.

2. In preparing the Bay Plan, employment data were needed only for water-oriented manufacturing to estimate future demand for water-related industry. Therefore, preliminary estimates of manufacturing employment in nine water-oriented industrial categories in the nine-county Bay Area have been used. Estimates by the Bay Area Transportation Study Commission based on the above population figures were selected: 225,000 in 1980 and 249,000 in 1990. By extension of the BATSC data, water-oriented manufacturing employment was estimated at 321,000 in 2020.

Safety of Fills

Findings and policies concerning Safety of Fills In the Bay

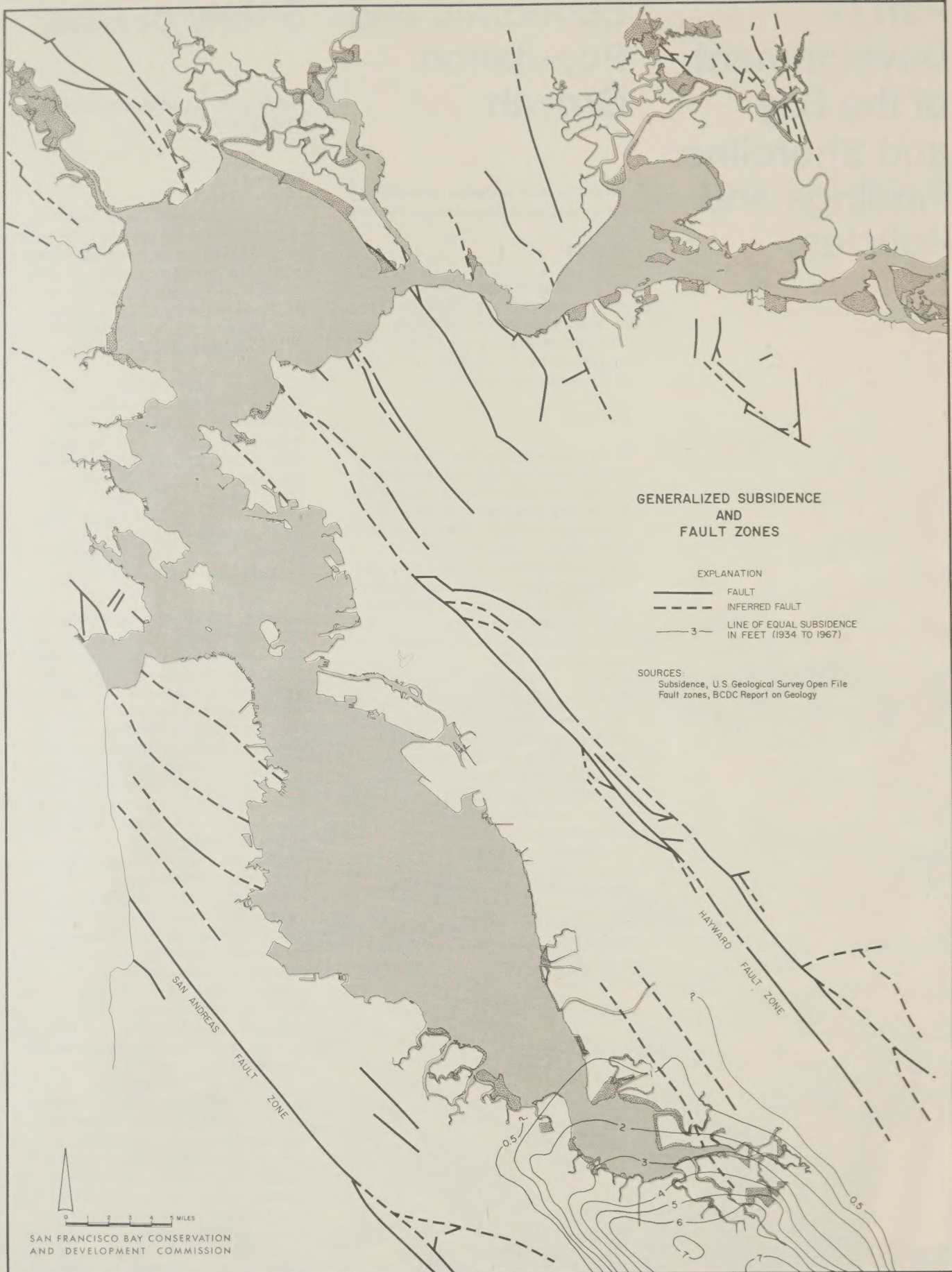
Findings

a. To reduce risk of life and damage to property, special consideration must be given to construction on filled lands in San Francisco Bay. (Similar hazards exist on other poor soils throughout the Bay Area, including soft natural soils, steep slopes, earthquake fault zones, and extensively graded areas.)

b. Virtually all fills in San Francisco Bay are placed on top of Bay mud. Under most of the Bay there is a deep, packed layer of old Bay mud. More recent deposits, called younger Bay mud, lie on top of the older muds. The top layer of young mud presents many engineering problems. The construction of a sound fill depends in part on the stability of the base upon which it is placed.

c. Safety of a fill also depends on the manner in which the filling is done, and the materials used for the fill. Similarly, safety of a structure on fill depends on the manner in which it is built and the materials used in its construction. Construction of a fill or building that will be safe enough for the intended use requires (1) recognition and investigation of all potential hazards—including (a) settling of a fill or a building over a long period of time, and (b) ground failure caused by the manner of constructing the fill or by shaking during a major earthquake—and (2) construction of the fill or building in a manner specifically designed to minimize these hazards. While the construction of buildings on fills overlying Bay deposits involves a greater number of potential hazards than construction on rock or on dense hard soil deposits, adequate design measures can be taken to reduce the hazards to acceptable levels.

d. There are no minimum construction codes regulating construction of fills on Bay mud because of the absence of sufficient data upon which to base such a code. Hazards vary with different geologic and foundation conditions, use of the fill, and the type of structures to be constructed on new fill areas. Therefore, the highest order of skilled judgment, utilizing the available knowledge of all affected disciplines, is required to (1) recognize and investigate all potential hazards of constructing a fill, and (2) design the fill and any construction thereon to minimize these hazards.



e. In the absence of adequate fill construction standards or codes, the BCDC appointed a Board of Consultants consisting of geologists, civil engineers specializing in soils engineering, structural engineers, and other specialists, to review, on the basis of available knowledge, all new fills that might be permitted in the Bay Plan, so that no fills would be included upon which construction might be unsafe. No specific fills are included in the Plan, but the Board of Consultants has completed an initial set of criteria (published separately as "Carrying Out the Bay Plan: The Safety of Fills") as a guide to future consideration of specific fill proposals.

f. Flood damage to fills and shoreline areas can result from a combination of heavy rainfall, high tides, and winds blowing onshore. To prevent such damage, buildings near the shoreline should be above the highest expected flood mark (nine feet above sea level is generally set as the safe mark except in the southern part of the South Bay, where the higher tides require almost a foot more elevation), or should be protected by dikes of an adequate height.

g. Excessive pumping from underground fresh water reservoirs has caused extensive subsidence of the ground surface in the San Jose area and as far north as Dumbarton Bridge (map of Generalized Subsidence and Fault Zones shows subsidence from 1934 to 1967). Indications are that if heavy groundwater pumping is continued indefinitely in the South Bay area, land in the Alviso area (which has already subsided about seven feet since 1912) could subside up to seven feet more; if this occurs, extensive dikes may be needed to prevent inundation of low-lying areas by the high tides.

Policies

1. The Bay agency should appoint a Fill Review Board consisting of geologists, civil engineers specializing in soils engineering, structural engineers, and architects competent to and adequately-empowered to (a) establish and revise safety criteria for Bay fills and structures thereon, (b) review all except minor projects for the adequacy of their specific safety provisions, and make recommendations concerning these provisions, (c) prescribe an inspection system to assure placement of fill according to approved designs, and (d) gather, and make available, performance data developed from specific projects. These activities would complement the functions of local building departments and local planning departments, none of which are presently staffed to provide soils inspections.

2. Even if the Bay plan indicates that a fill may be permissible, no fill or building should be constructed if hazards cannot be overcome adequately for the intended use in accordance with the criteria prescribed by the Fill Review Board.

3. To provide vitally-needed information on the effects of earthquakes on all kinds of soils, installation of strong-motion seismographs should be required on all future major land fills. In addition, the Bay agency should encourage installation of strong-motion seismographs in other developments on problem soils, and in other areas recommended by the U. S. Coast and Geodetic Survey, for purposes of data comparison and evaluation.

4. To prevent damage from flooding, buildings on fill or near the shoreline should have adequate flood protection as determined by competent engineers. As a general rule, buildings near the shoreline should be at least nine feet above mean sea level (standard U.S.G.S. datum) or should be protected by dikes of an equivalent height and by any necessary pumping facilities. In the southern half of the South Bay, this height should be at least ten feet. Exceptions to the general height rule may be made for developments specifically designed to tolerate periodic flooding.

5. To minimize the potential hazard to Bayside development from subsidence due to groundwater withdrawal, all proposed developments at the lower end of the South Bay should be sufficiently high above mean sea level or sufficiently protected by dikes to allow for the effects of additional subsidence, utilizing the latest information available from the U. S. Geological Survey.

Water-Related Industry

Findings and policies concerning Water-Related Industry on the Bay

Findings

a. Industries of many types require frontage on navigable waters to receive raw materials and to distribute processed materials by ship. These are "water-related industries."

b. Water-related industry is basic to the economy of the Bay Area and of the western United States. Therefore, the needs of water-related industry must be given high priority in the Bay Plan.

c. Land suitable for water-related industry will probably be in short supply well within the next 50 years. Such land is therefore a resource that must be carefully managed and ultimately used only by industries specifically requiring a waterfront site. Waterfront industrial sites should also be planned so as to avoid wasteful use of the limited supply.

d. Many other industries compete with water-related industries for waterfront sites: (1) industries that need to have large volumes of water available for cooling and therefore seek sites near the Bay; these are "water-using industries;" (2) industries that supply or use the products of water-related industries and therefore seek locations near them; these are "linked industries;" (3) other industries that simply seek locations close to freeways and railroads, which are often along the Bay shoreline.

Policies

1. Because shoreline land suitable for water-related industry will eventually become scarce, such land should be reserved now specifically for this purpose. The amount of additional land to be reserved should be determined on the basis of the best data available, using a 50-year planning period to anticipate future needs as well as possible. On the basis of the 50-year manufacturing employment estimates derived from data published by the Bay Area Transportation Study Commission in April, 1968, a range of from 11,000 to 19,000 additional acres of land suitable for water-related industry and not now in that use should be reserved. The Bay Plan provides for reserving the higher figure of approximately 19,000 acres. This amount will be supplemented

by: (a) additional lands within the nine-county Bay Area but outside the proposed Bay agency jurisdiction, (b) acreage that might be added by authorized fills, (c) acreage that might be used by water-related industries in addition to the reserved priority areas, and (d) very large acreages available in the Delta, outside the nine-county Bay Area. In addition, the Plan reserves 6,000 acres of prime industrial land now used predominantly by existing water-related industries.

2. The determination as to which lands to reserve for water-related industry should be made on the basis of the following location criteria:

	<i>Maximum Points</i>
Channel (or Pipeline) Access	20
Rail Access	10
Freeway Access	10
Major Highway Access	5
Size of Land Area	15
Grade of Site	10
Foundation Suitability	15
Size of Ownership Units	5
Present Use	10
Highest count	100

Preference for industrial use should be given to lands on the basis of these criteria, but with due regard that such sites not unnecessarily interfere with the recreational and fish and wildlife resources of San Francisco Bay and with the use of these resources.

3. Land reserved for water-related industries should ultimately be used only by industries specifically requiring waterfront sites for extensive shipping by water. (Water-using industries and linked industries should be located outside of the area reserved for water-related industry; local jurisdictions should take steps to reserve sites for them in the vicinity of water-related industry reserves.)

4. All of the land reserved for water-related industry will not be needed at once, and other uses can be allowed in the interim. Tax policy and property tax assessments should recognize that water-related industrial uses may be many years away.

5. Water-related industrial sites should be planned so as to avoid wasteful use of the limited supply of waterfront land. The following principles should be followed to the maximum extent feasible in planning for water-related industry:

a. Extensive use of the shoreline for storage of raw materials, fuel, products, or wastes should not be permitted on a longterm basis. If required, such storage areas should generally either be at right angles to the main direction of the shoreline or be as far inland as feasible, so other use of the shoreline may be made possible.

b. Where large acreages are available for industry, site planning should strive to provide access to the shoreline for all future plants that might locate in the same area. (As a general rule, therefore, the longest dimension of plant sites should be at right angles to the shoreline.) Docking facilities at waterfront industrial concentrations should also be shared as much as possible among industries and, also, if appropriate, with public port agencies.

c. If the shoreline that is freed by sharing of the shoreline or inboard location of storage areas is put to public use, the industries involved may need to be compensated for any excessive added capital and operating costs for longer pipelines and conveyor systems.

d. Waste treatment ponds for water-related industry should occupy as little land as possible.

e. Any new highways, railroads, or rapid transit lines in existing or future water-related industrial areas should be located sufficiently far away from the waterfront so as not to interfere with industrial use of the waterfront. New access roads to waterfront industrial areas should be approximately at right angles to the shoreline, topography permitting.

Some filling may be necessary at some sites despite the most careful attention to proper site layout.

6. Water-related industry should be planned so as to make industrial sites attractive (as well as economically-important) uses of the shoreline. The following criteria should be employed to the maximum extent possible:

a. Air and water pollution should be minimized through enforcement of the highest feasible standards.

b. When Bayfront hills are used for water-related industries, terracing should generally be required and leveling of the hills should not be permitted.

c. Important Bay overlook points, and historic areas and structures that may be located in water-related industrial areas, should be preserved and incorporated into the site design, if at all feasible. In addition, shoreline not actually used for shipping facilities should be used for some type of public access or recreation, to the maximum extent feasible. Public areas need not be directly accessible by private automobiles with attendant parking

lots and driveways; access may be provided by hiking paths or by forms of public transit such as elephant trains or aerial tramways.

d. Regulations, tax arrangements, or other devices should be drawn in a manner that encourages industries to meet the foregoing objectives. In addition, if a sizeable area is to be obtained for public use in an existing industrial site, a public agency should be authorized, but not obligated, to assist the industry in obtaining suitable adjacent land to replace areas given over to public use. Once industry and public agencies agree on site development and design plans, the public agency should be firmly committed to (1) construct and maintain agreed-upon improvements, (2) enact and enforce controls to prevent encroachment of incompatible uses into the industrial area, and (3) refrain from making unreasonable additional demands on the industry that were not included in the original plan approval.

7. To reduce pressure for use of waterfront areas by non-water-related industries seeking only freeway and railroad access, construction of needed freeways and railways in inland locations should be encouraged by the Bay agency. As soon as possible, a comprehensive regional planning agency should make an adequate study of **all** (not just water-related) industrial land needs in the Bay Area; it may well prove necessary for a limited regional government to reserve industrial sites near railways and freeways in and around the Bay Area for industries that specifically require rail and freeway access, if pressure is to be effectively removed from waterfront areas.

Ports

Findings and policies concerning Ports on the Bay

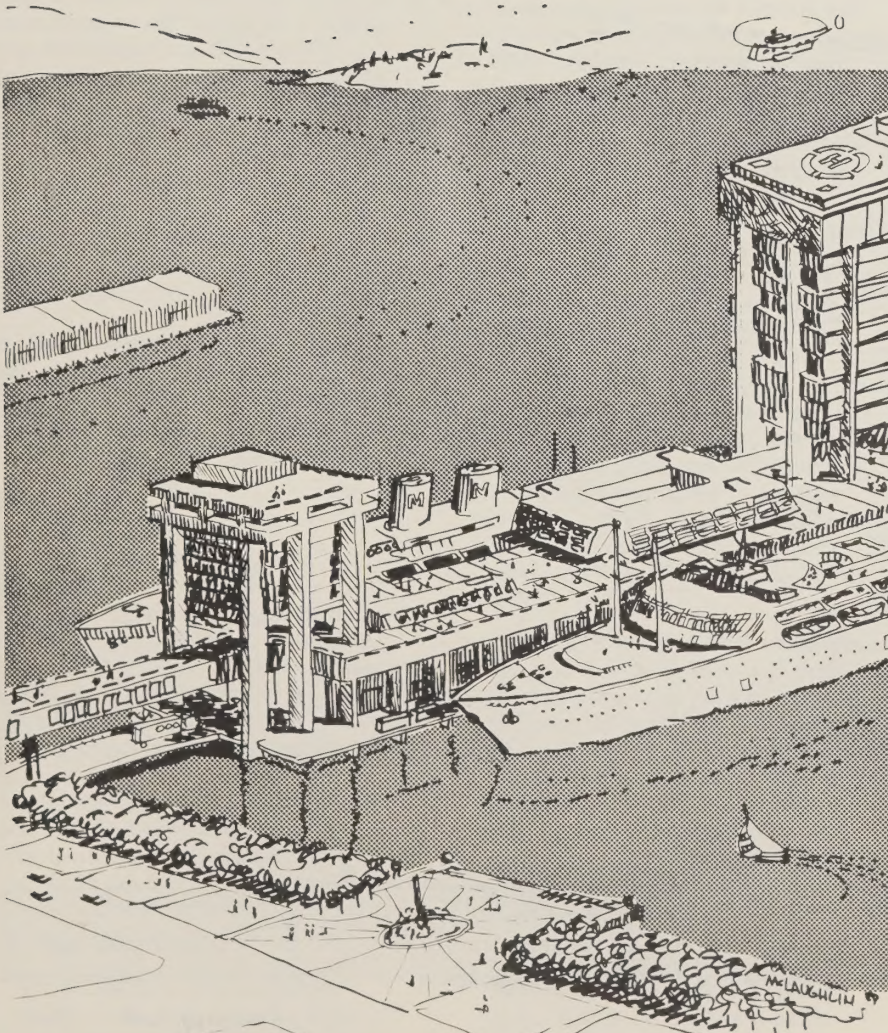
Findings

- a. San Francisco Bay is one of the world's great natural harbors, and maritime commerce is of primary importance to the entire economy of the Bay Area.
- b. Adequate modern port terminals and deeper shipping channels will be needed to preserve and enhance the standing of the Bay Area as a major world harbor and to keep pace with changes in shipping technology.
- c. Of particular importance for Bay planning are the expected growth in size of tankers and bulk carriers, which will require deeper channels than any now in the Bay; and new methods of cargo handling such as containerization, which require exceptionally large specially-designed terminals and supporting transportation facilities.
- d. Planning for port terminals should be carefully coordinated with other shoreline uses, should consider the Ports of Sacramento and Stockton as part of the port system available to meet future needs, and should have as a major objective the avoidance of unnecessary Bay filling.
- e. No single port agency is responsible for coordinated planning and development of Bay Area port terminals. As a result, new port facilities may be built by whichever individual port can command the necessary financing, even though another site might serve regional needs equally well but with less Bay filling. In addition, a major investment by one publicly-operated port can be jeopardized by the unnecessarily duplicating actions of another publicly-operated Bay Area port. And, of particular importance to proper use of the Bay, parts of the Bay can be filled, and shoreline areas taken, for unnecessarily competing port uses.

- f. Ports are not supported completely by revenues from shipping, but must be subsidized, either directly through taxes or else indirectly through revenues derived from housing, industry, restaurants, and other such uses of port-owned property.

Policies

1. Future port planning and development—but not necessarily port operation—should be guided by an overall regional port development plan.



9 Passengership Terminal in a Multipurpose Structure

2. If some ports in the regional system do not have the funds necessary to complete facilities needed by the region, a regional agency may be required to finance or develop them. Otherwise, there will be tremendous pressure to allow the ports with the strongest finances to provide all of the regional facilities, even though this might result in unnecessary filling of the Bay.

3. Some filling and dredging will be required to provide for necessary port expansion, but any permitted fill or dredging should be in accord with an overall regional port development plan.

4. The initial regional port development plan should be as illustrated in the Bay Plan maps. The Plan accommodates the total projected cargo tonnage requirements to the year 2020 with a minimum of Bay filling. It provides for:

a. Major expansion of port facilities at Benicia, Redwood City, and Richmond;

b. Substantial redevelopment of existing facilities at Alameda, Oakland, and San Francisco;

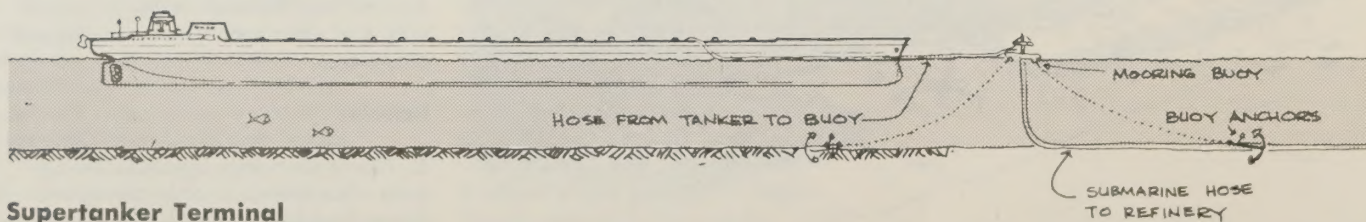
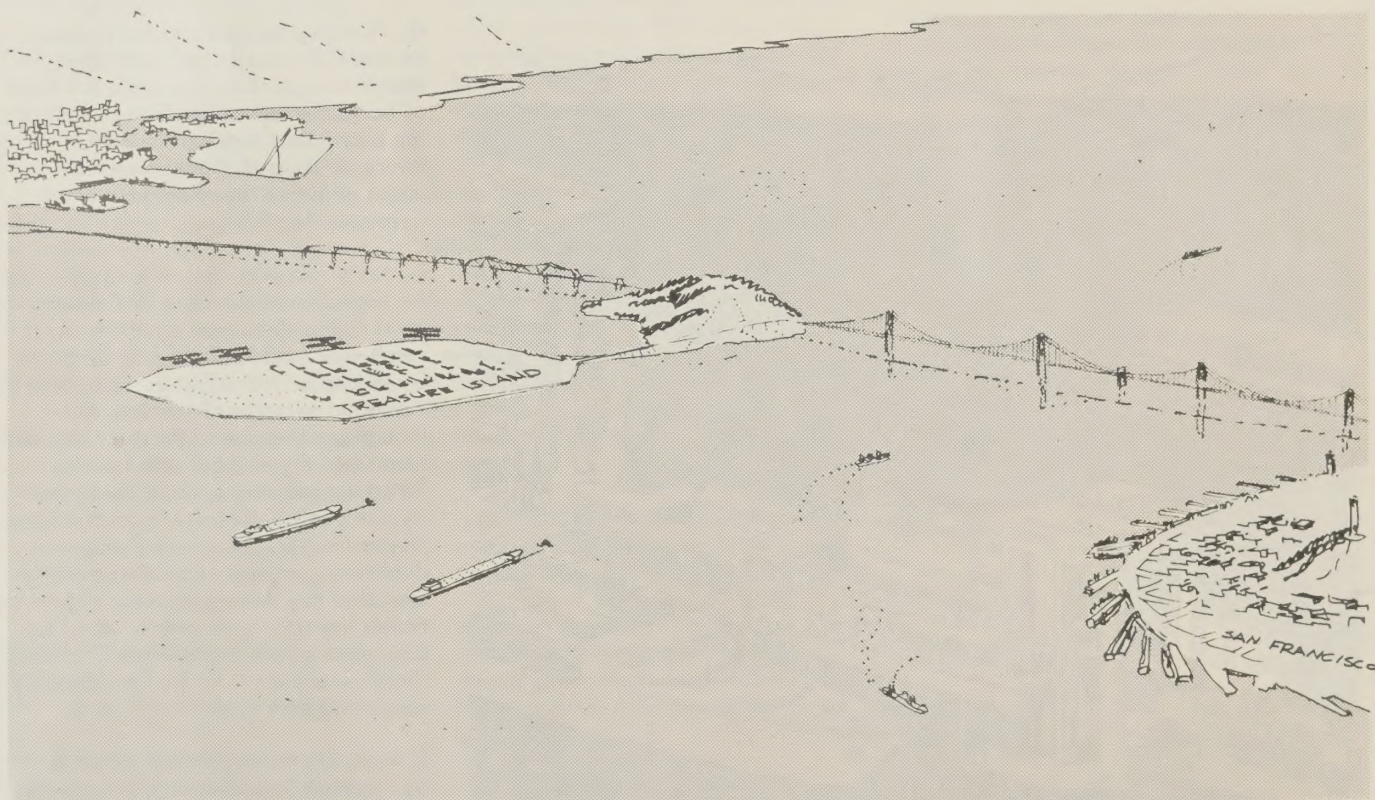
c. Possible new shallow-draft terminals near Napa, Petaluma, and San Jose;

d. A possible supertanker terminal in the Central Bay, as a long-range alternative to constructing and maintaining ever deeper channels to North Bay refineries. (The giant ships, which may have drafts in excess of 60 feet, would use the terminal to transfer their cargoes to smaller vessels or pipelines.) The Central Bay terminal could be a small, pile-supported structure to hold pipeline connections or it could simply be a reserved anchorage; no Bay fill or storage facilities would be needed; and

e. Further deepening of ship channels as needed to accommodate expected growth in ship size, possibly as deep as 70 feet through the Golden Gate, up to 60 feet to North and Central Bay ports, and 45 feet to Redwood City.

5. It is possible that in the future, cargoes moving between the Orient and the East Coast of the U. S. will be shipped across the United States by special trains. This would tend to concentrate additional shipping volume in one port where special facilities would be available for transfer of cargoes between ships and the special trains. Any additional port facilities required for this method of transportation should be provided with as little Bay filling as possible.

6. Port areas on the shores of the Bay should be able to include within their premises marine terminals and directly-related ancillary activities such as warehousing and other temporary storage, ship repairing, support transportation uses including trucking and railroad yards, freight forwarders, government offices related to the Port activity, chandlers and marine services. Other uses, especially public access and public and commercial recreational development, should also be permissible uses provided they do not significantly impair the efficient utilization of the port area.



Supertanker Terminal

Airports

Findings and policies concerning Airports on the Bay

Findings

a. The shoreline of the Bay is a favored location for airports because the Bay provides an open space for takeoffs and landings away from populated areas. A Bayshore location is also conveniently close to present population centers.

b. The introduction of larger and faster aircraft has caused rapid rises in passenger volume and has made air transportation of cargo increasingly economical. Further sharp increases in passenger and cargo volume may be expected.

c. The growth of aviation in the Bay Area will require additional land area for (1) expansion of terminals, (2) aircraft operating, loading, and parking, (3) automobile parking, (4) surface transportation routes linking airports with major population centers, and (5) cargo storage. In addition, land near airports will be sought by industries that ship large quantities of products by air, and by warehousing firms and others heavily dependent on air commerce.

d. Effective, long-term operation of airports requires that a buffer zone be created to keep tall buildings and residential areas at some distance from aircraft operations.

e. The aviation needs of the Bay Area are regional in extent, and effective planning to provide for the growth of aviation can only be done on a comprehensive, regional basis.

Policies

1. To enable the Bay Area to have adequate airport facilities, and to minimize the harmful effects of airport expansion upon the Bay, a regional airport system plan should be prepared at the earliest possible time by a responsible regional agency. The study should have the full participation of all governmental agencies having region-wide planning responsibilities and all other agencies, including private groups, having a substantial interest in the Bay Area's present or future aviation needs and facilities. The plan should include as a minimum:

a. An analysis of expected air traffic in the Bay Area, by types—commercial, military, and general (small plane).

b. An analysis of alternative sites for building new airports or expanding present ones, taking into account the effect of each site on the surrounding environment.

c. An analysis of the surface transportation necessary to serve the alternative sites for future airports.

d. An analysis of the effects of new airports upon the location of jobs and homes within the Bay Area.

2. Pending completion of a comprehensive airport system plan, and recognizing that various classes of airports must be included in any plan for the region or the Bay, it is assumed that:

a. A system of **reliever airports** will be created throughout the region instead of one or two very large facilities. Some short-range traffic (500 miles or less, e.g., San Francisco-Los Angeles), which is a major portion of total air carrier traffic, will be diverted to reliever airports, and improved ground and air transportation links will be provided among the airports in the system. Under this concept, it is assumed that San Francisco and Oakland International Airports will continue to service most long-distance flights and that pressures for continued expansion of these airports can be reduced by diverting a portion of the short-range and general aviation traffic to reliever airports in such cities as San Jose, Santa Rosa, and Napa.

It is assumed that three years will be needed to complete an adequate regional airport system plan, and as many as five to seven years thereafter to build facilities proposed in the plan. Therefore, pending completion of the comprehensive airport system plan, capital investment in, and any Bay filling for, major airports in the Bay region should be limited to improvements needed within the next 10 years (i.e., before 1979).

b. Airports for **general aviation** can and should be at inland sites whenever possible. New airports for this purpose should be constructed away from the Bay; Bayshore sites and Bay filling should be allowed only if there is no feasible alternative. Expansion of *existing* general aviation airports should be permitted on Bay fill only if no feasible alternative is available.

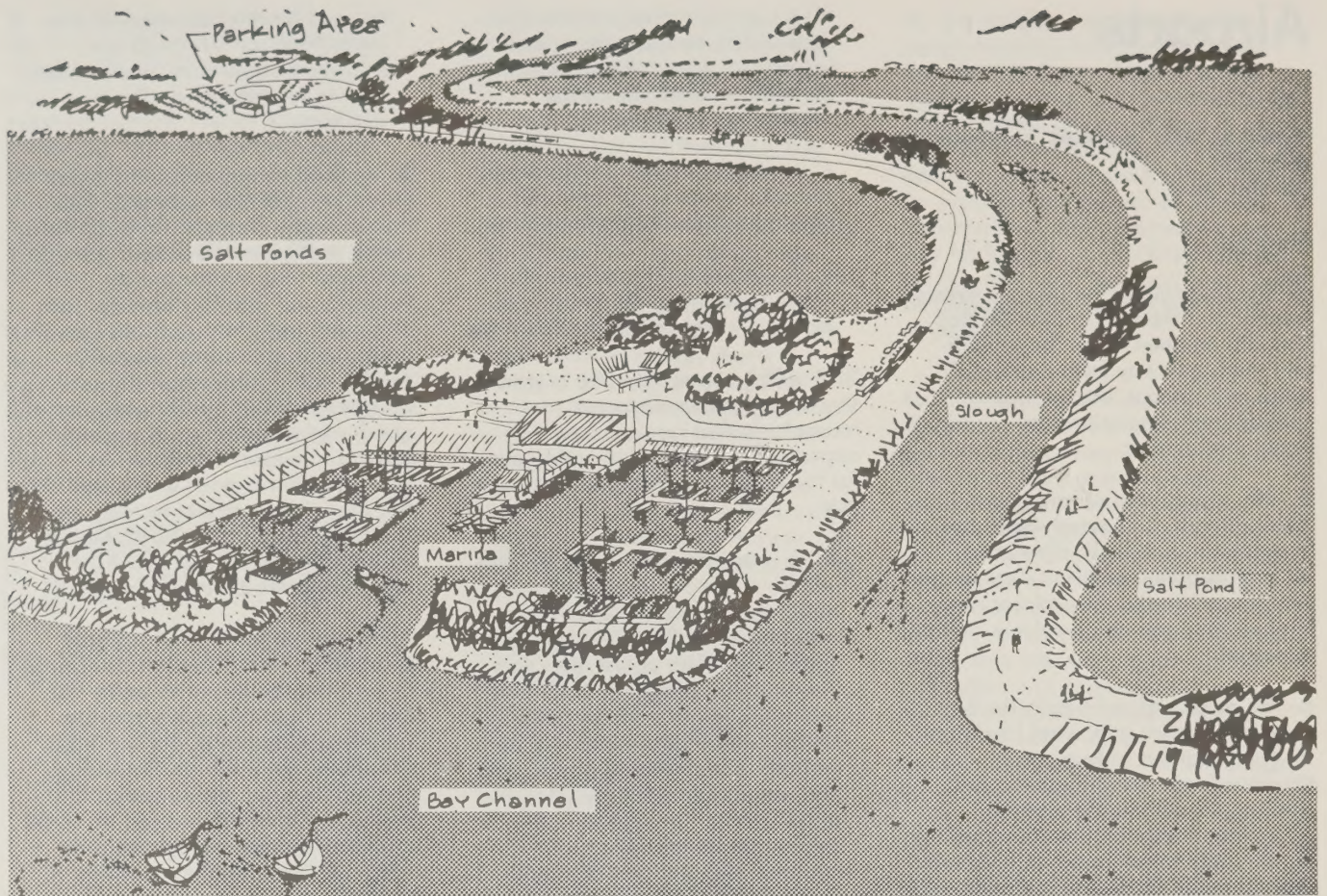
c. **Heliports** may in some instances need to be located on the shores of the Bay to be close to a traffic center with minimum noise interference. In general, existing piers should

be used for this purpose and new piers, floats, or fill should be permitted only if it is demonstrated that no feasible alternative is available.

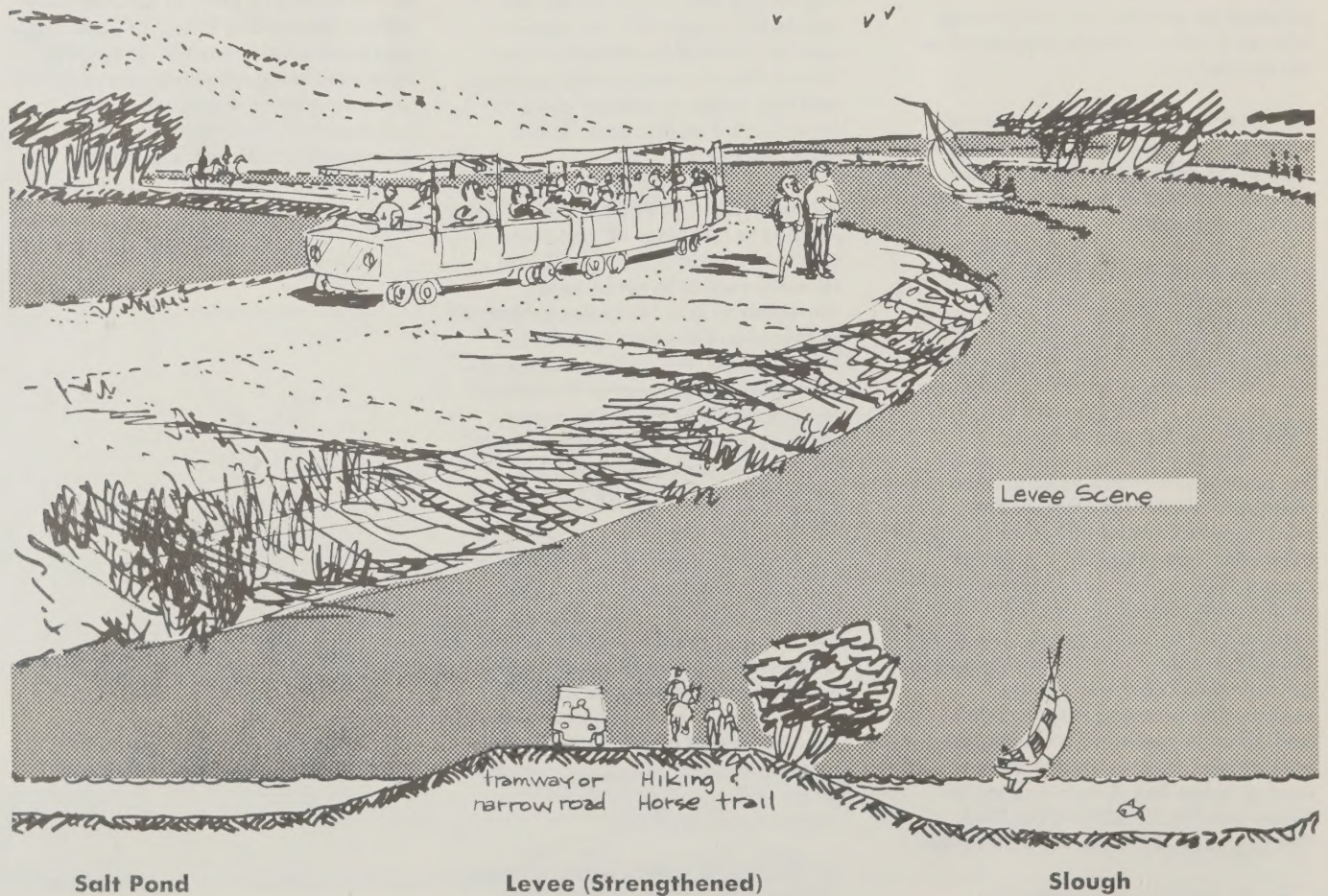
3. Airports on the shores of the Bay should be permitted to include within their premises terminals for passengers, cargo, and general aviation; parking and supporting transportation facilities; and ancillary activities such as aircraft maintenance bases that are necessary to the airport operation. Airport-oriented industries (those using air transportation for the movement of goods and personnel or providing services to airport users) may be located within airports designated in the Bay Plan if they cannot feasibly be located elsewhere, but no fill should be permitted to provide space for these industries directly or indirectly.

4. If some airports in the regional system do not have the funds necessary to complete facilities needed by the region, a regional agency may be required to finance or develop them. Otherwise, there will be tremendous pressure to allow the airports with the strongest finances to provide all of the regional facilities, even though this might result in unnecessary filling of the Bay.

5. To enable airports to operate without additional Bay filling, tall buildings and residential areas should be kept from interfering with aircraft operations. The Bay agency should prevent incompatible developments within its area of jurisdiction around the shoreline.



Bayside Park in South Bay Salt Pond Area



Recreation

Marinas ²	1,290 acres ¹
Launching ramp facilities ³	2,230 acres ¹
Swimming beaches	230 acres ¹
Total shoreline acreage	3,750 acres
Fishing piers (lineal feet of gross length)	40,000 lineal feet

¹ Dry land only, including parking and ancillary requirements. Some fill may be needed.

² Based on estimated requirement of 70,000 boat slips by 2020, including about 750 square feet of dry land per berth for support facilities (would necessitate around 200 marinas at an average density of 44 boats per acre). Excludes dry storage acreage estimated at 540 acres on basis this need not be provided directly on the waterfront.

³ Based on estimated requirement for 210 launching ramp facilities with an average of six 12-foot wide launching lanes each (rough guide; actual sizes will vary).

Findings and policies concerning Recreation On and around the Bay

Findings

a. Seven years ago, only about four miles of the 276-mile Bay shoreline were being used for waterfront parks. Since then, increased interest in the Bay has resulted in development of additional parks, marinas, and other forms of water-oriented recreation. But the full recreational potential of the Bay has by no means yet been reached.

b. The demand for recreational facilities in the Bay Area will increase even more rapidly than the population increases, and will be accelerated as the work week is shortened and as spending power per capita increases. Many more recreational facilities will be needed.

c. Planning for recreational uses of the Bay and shoreline should anticipate needs as far into the future as possible. All sites near the Bay that may be needed for recreation in the future should be reserved now; otherwise, most of this land will have been taken for other uses by the time it is needed. At the present time, 50 years appears to be the farthest into the future that any needs can be projected reasonably, so recreational needs to the year 2020 should be considered.

d. A major supplement to parks, marinas, and other forms of water-oriented recreation are the several areas of water-oriented commercial recreation and public assembly that have been developed around the Bay, such as the Ghirardelli Square-Fisherman's Wharf-Northern Waterfront area in San Francisco, Jack London Square in Oakland, and the downtown waterfronts of Sausalito and Tiburon.

e. Additional commercial recreation and public assembly are desirable uses of the shoreline if they permit large numbers of persons to have direct and enjoyable access to the Bay. These uses can often be provided by private development at little or no direct cost to the public.

Policies

1. Based on an estimated future population of 10.8 million, the Plan maps should include the following facilities:

For parks, there is no practical estimate of the acreage that should be provided on the shoreline of the Bay, but it is assumed the largest possible portion of the total regional requirement should be provided adjacent to the Bay.

2. The Bay Plan maps indicate 77 marinas and 39 fishing pier sites. If present trends continue, these will be adequate for the immediate future but not for the next 50 years. Therefore, sites should be reserved for all marina and fishing pier installations indicated on the maps. The Bay agency should also allow additional marinas, boat-launching lanes, and fishing piers elsewhere on the Bay, provided they would not preempt land or water areas needed for other priority uses and provided they would be feasible from an engineering viewpoint.

3. The Bay Plan maps include about 5,000 acres of existing shoreline parks and 5,800 acres of new parks on the waterfront. In addition, 4,400 acres of military establishments (especially around the Golden Gate) are proposed as parks if and when military use is terminated.

4. The following general standards have been used in determining locations for each type of recreational facility (and should be used as a guide in allowing additional ones):

a. General. Each type of facility should be well distributed around the shores of the Bay to the extent consistent with more specific criteria below. Any concentrations of facilities should generally be as close to major population centers as is feasible. Recreational facilities should not preempt sites needed for ports, waterfront industry, or airports, but efforts should be made to integrate recreation into such facilities to the extent they might be compatible. Different types of compatible public and commercial recreational facilities should be clustered to the extent feasible to

permit joint use of ancillary facilities and provide greater range of choice for users.

b. Marinas and launching lanes. (1) Sites that tend to fill up unusually rapidly with silt or mud, or that are subject to unusual amounts of dense fog, should be avoided, (2) launching lanes should be placed where wind and water conditions would be most favorable for smaller boats, (3) some launching lanes should be located near prime fishing areas and others near calm, clear water suitable for water-skiing. Fill permitted for marina development should be the minimum necessary to provide support facilities (parking, service buildings, launching lanes, etc.). At a density of 44 berths per acre of water surface, about $\frac{3}{4}$ acre of land is generally sufficient for each acre of water surface (750 sq. ft. per berth). Marinas having fewer than 44 boats per acre require less land per berth. No fill for marinas should be permitted to exceed $\frac{3}{4}$:1 land/water ratio.

c. Fishing piers should not block navigation channels, nor interfere with normal tidal flow.

d. Beach sites. (1) Beaches for swimming and sun-bathing should generally be in warm areas protected from the wind. (2) Some new beaches could be planned adjacent to power plants or other industrial plants that warm the nearby waters as they discharge heated water that has been used to cool industrial machinery.

e. Water-oriented commercial-recreational establishments, such as restaurants, specialty shops, theaters, and amusements, should be encouraged in urban areas adjacent to the Bay. Some suggested locations for this type of activity are indicated on the Plan maps. Effort should be made to link commercial recreation centers (and major shoreline parks) by a fleet of small, inexpensive ferries similar to those operating on some European lakes and rivers.

5. Features to be included. To assure optimum use of the Bay for recreation, the following facilities should be encouraged in shoreside parks and in or near yacht harbors or commercial ferryboat facilities:

a. In shoreside parks. (1) Where possible, parks should provide some camping facilities accessible only by boat. Up to 2,200 such campsites will be needed by the year 2020. In addition, docking and picnic

facilities should be provided for boaters. (2) To capitalize on the attractiveness of their Bayfront location, parks should emphasize hiking, bicycling, riding trails, picnic facilities, viewpoints, beaches, and fishing facilities. Recreational facilities that do not need a waterfront location, e.g., golf courses and playing fields, should generally be placed inland, but may be permitted in shoreline areas if they are part of a park complex that is primarily devoted to water-oriented uses.

(3) Where shoreline open space includes areas used for hunting waterbirds, public areas for launching rowboats should be provided so long as they do not result in overuse of the hunting area. (4) Where open areas include ecological reserves, access via catwalk or other means should be provided for nature study to the extent that such access does not excessively disturb the natural habitat. (5) Limited commercial recreation facilities, such as small restaurants, should be permitted within waterfront parks provided they are clearly incidental to the park use, are in keeping with the basic character of the park, and do not obstruct public access to and enjoyment of the Bay. Limited commercial development may be appropriate (at the option of the park agency responsible) in all parks shown on the Plan maps except where there is a specific note to the contrary.

b. In or near yacht harbors or commercial ferryboat facilities.

Private boatels and restaurants should be encouraged.

6. All the waterfront *land* needed for recreation by the year 2020 should be reserved now, because delay may mean that needed shoreline will otherwise be preempted for other uses. However, recreational *facilities* need not be built all at once; their development can proceed in accordance with recreational demand over the years.

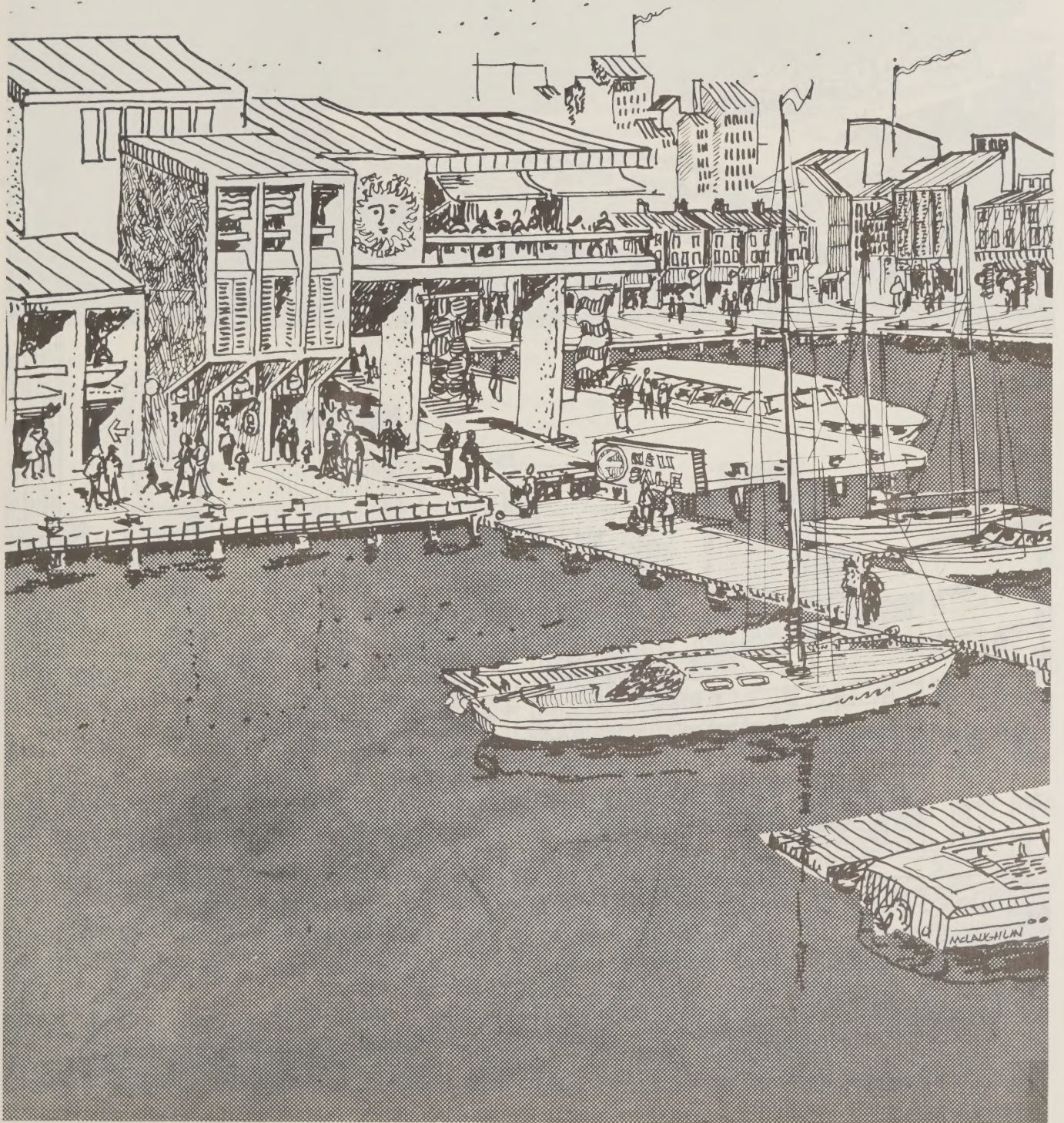
7. In addition to the major recreational facilities indicated on the Plan maps, public access should be included wherever feasible in any shoreline development, as described in the policies for Public Access to the Bay (page 29). That policy is intended to result in much more access to the Bay than can be provided by public parks alone, especially in urban areas, and to encourage private development of the shoreline.

8. Further study should be given to the feasibility of dredging a network of channels paralleling the shoreline in shallow areas, for use by small boats

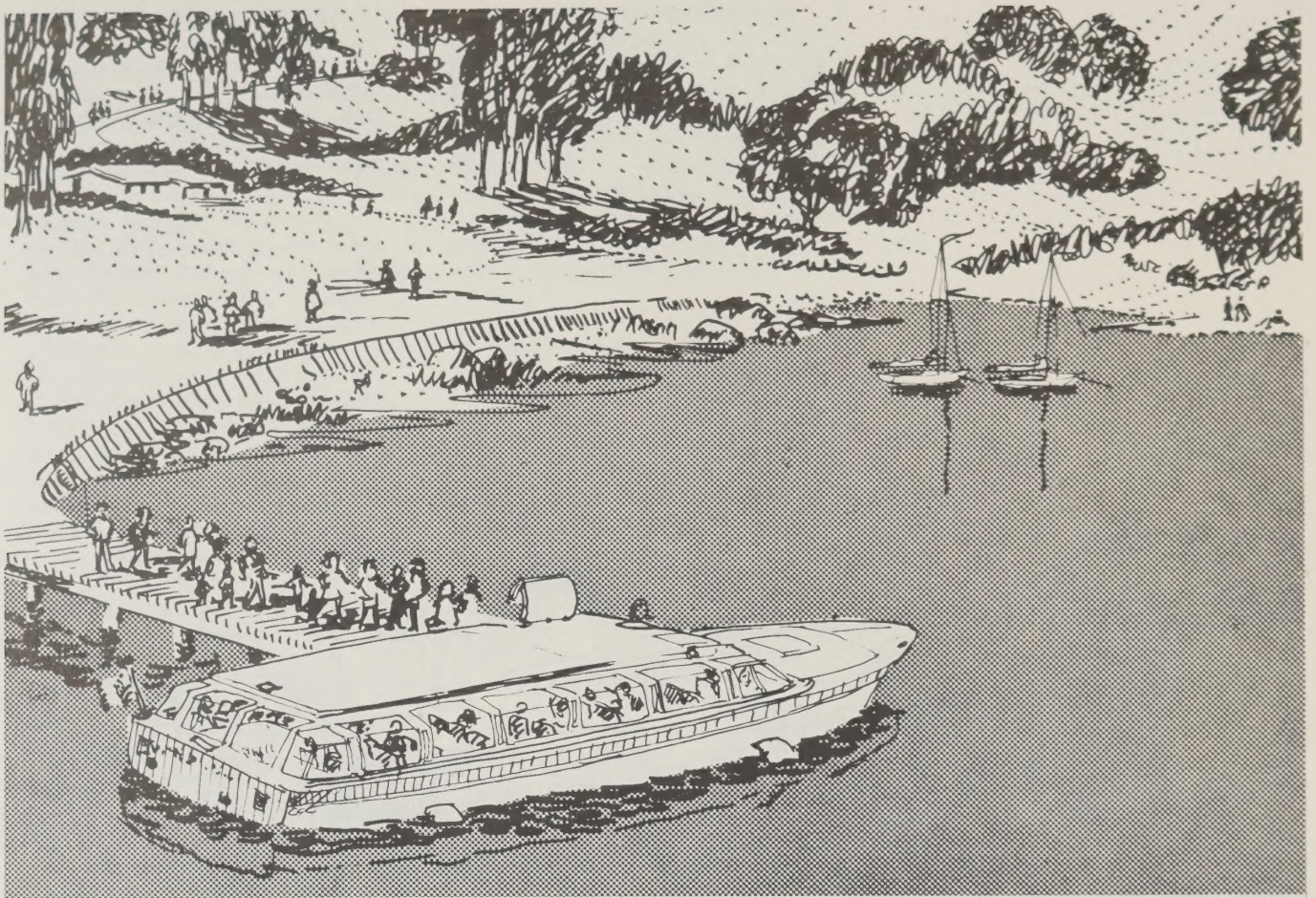
and recreational ferries. Channels could open up large areas, particularly in the South Bay and San Pablo Bay, for recreational boating, could make possible the development of marinas and launching lanes at more frequent intervals, and could add visual interest to shoreline areas. In addition, the channels could separate marshes and mudflats from dry land, thus enhancing the wildlife value of these areas.

9. To enhance the appearance of shoreline areas, and to permit maximum public use of the shores and waters of the Bay, flood control projects should be carefully designed and landscaped and, whenever possible, should provide for recreational uses of channels and banks.

10. Because of the need to increase the recreational opportunities available to Bay Area residents, small amounts of Bay filling may be allowed for shoreline parks and recreational areas that provide substantial public benefits and that cannot be developed without some filling.



Commercial Recreation at Waterfront



1 Ferry Stop at Waterfront Park



2 Ferry Stop in an Urban Area

Salt Ponds and Other Managed Wetlands

Findings and policies concerning Salt Ponds and Other Managed Wetlands

Findings

a. Salt ponds total some 36,000 acres in the South Bay and some 10,000 acres in the North Bay. About 4,200 acres of salt ponds have been removed from salt production and are now being converted into the Redwood Shores community, which will ultimately house some 60,000 persons.

b. The salt ponds are an economically important and productive use of the waters of the Bay (for extracting salt), and the salt is an important raw material for the Bay Area chemical industry.

c. The ponds provide 15 percent of the total Bay and pond water surface. This large pond surface area supplements the water surface of the Bay and thus helps to moderate the Bay Area climate and to prevent smog.

d. The ponds are used as a habitat by shore birds.

e. More than 50,000 acres of managed marshland, adjacent to the Bay but diked off from it, are maintained as duck hunting preserves, game refuges, and occasionally as farming areas. In most of these areas, tide gates permit occasional intakes of Bay water.

f. The diked marshlands are as important to wildlife as the tidal marshes. Substantial further diminution would result in a proportionate reduction in the amount of wildlife the Bay system can support.

g. The ponds and other wetlands provide some of the open space character of the Bay.

Policies

1. As long as is economically feasible, the salt ponds should be maintained in salt production and the wetlands should be maintained in their present use. Property tax policy should assure that rising property taxes do not force conversion of the ponds and other wetlands to urban development.

In addition, the integrity of the salt production system should be respected (i.e., public agencies should not take for other projects any pond or portion of a pond that is a vital part of the production system).

2. If, despite these provisions, the owner of the salt ponds or the owner of any managed wetland desires to withdraw any of the ponds or marshes from their present uses, the public should make every effort to buy these lands, breach the existing dikes, and reopen these areas to the Bay. This type of purchase should have a high priority for any public funds available, because opening ponds and managed wetlands to the Bay represents man's last substantial opportunity to enlarge the Bay rather than shrink it. (In some cases, if salt ponds are opened to the Bay, new dikes will have to be built on the landward side of the ponds to provide the flood control protection now being provided by the salt pond dikes.)

3. If public funds do not permit purchase of *all* the salt ponds or marshes proposed for withdrawal from their present uses, and if some of the ponds or marshes are therefore proposed for development, consideration of the development should be guided by the following criteria:

a. Just as dedication of streets, parks, etc., is customary in the planned unit development and subdivision laws of many local governments, dedication of some of the pond or marsh areas as open water can and should be required as part of any development. Highest priority to such dedication should be given to ponds that (1) would, if opened to the Bay, significantly improve water circulation, (2) have especially high wildlife values, or (3) have high potential for water-oriented recreation.

b. Depending on the amount of pond or marsh area to be dedicated as open water, the public may wish to purchase additional areas. Plans to purchase any ponds or marshes should give first consideration to the priorities in paragraph a. above.

c. Development of the ponds or marshes should provide for retaining substantial amounts of open water, should provide for substantial public access to the Bay, and should be in accord with the Bay Plan policies for non-priority uses of the shoreline.

4. As soon as possible, recreational developments such as marinas and small parks should be built in appropriate areas outboard of the present salt

ponds, or in sloughs; but these developments should in no way jeopardize the salt production system or be so located as to prevent opening of ponds to the Bay at any future time.

5. The agency designated to carry out the Bay Plan should study the possibility of public purchase of "development rights" to the ponds. If these rights were bought by the public, the owner of the ponds would remain fully able to continue using them for salt production but would not be able to fill the ponds for urban development. Similar study should be given to acquisition of "development rights" to the duck clubs and other diked wetlands, to continue them in their present uses.

Transportation

Findings and policies concerning Transportation On and around the Bay

Findings

a. At present, there is no regional coordination of all the means of moving people and goods that make up the total transportation system of the Bay Area. Transportation planning for the Bay Area is divided among highway agencies, transit agencies, planning agencies, and regulatory agencies. The only comprehensive transportation planning agency in the Bay region is the Bay Area Transportation Study Commission, which was created by the State Legislature and which will present its transportation plans in early 1968.

b. Primary emphasis in recent years has been placed on freeways, which in some instances have been built on fill in the Bay because acceptable routes could not be found ashore. Little attention has been given in recent years to using the waters of the Bay for modern boat transportation.

c. Massive use of the automobile during a time of rapid population growth in the Bay Area endangers the environment both because of the air pollutants emitted by automobiles and because of the space required by automobiles for roadways and for parking.

d. Primary reliance on the automobile for surface transportation in the Bay Area means further pressures to use the Bay as a route for future freeways. Therefore, a primary goal of transportation planning, from the point of view of preserving and properly using the Bay, should be substantial reduction in dependence on the automobile. While the private car will still be needed and used for many types of travel, the goal should be development of new systems of transportation that can carry large volumes of people and goods without damaging the environment of the Bay Area.

Policies

1. The Bay represents a great but, at present, little-used resource for transportation within the region. New types of faster barges may be able to move trucks and freight from point to point within the region at low cost and without adding to surface congestion. Also, a system of modern ferries (capable of high speeds with minimum noise and waves) may be able to provide service

between major traffic generators (e.g., between downtowns, or between downtowns and airports) and eventually to provide scheduled service from one end of the Bay to the other for both commuting and pleasure use. The Bay Plan maps indicate possible sites for commuter ferry terminals and shallow-draft ports.

2. Because of the continuing vulnerability of the Bay to filling for freeways, an effective program should be created to develop, test, and inaugurate new methods of transportation within the Bay Area. This should be undertaken by a regional transportation agency, preferably one that is part of a limited regional government.

3. If any additional freeway or bridge route is proposed in or across the Bay other than those indicated on the Bay Plan maps, adequate research and testing should determine whether new methods of transportation could overcome the particular congestion problem without a route in the Bay and, if not, whether a tunnel beneath the Bay is at all feasible.

4. If a route must be located over the Bay, the following provisions should apply:

a. The freeway or other crossing should be placed on bridge-like structures, not on fill.

b. Structures should provide adequate clearance for commercial ships, Navy ships, and pleasure boats to have uninterrupted passage at all times.

c. Toll plazas, service yards, or other ancillary features should be located on new fill only if there is no feasible alternative.

d. To provide maximum ultimate capacity on any new major facility that is allowed over the Bay (and thus to minimize the number that might have to be allowed in the Bay), the design of the structures should anticipate future mass transit facilities (unless they are adequately paralleled by such facilities) and subsequent installation of automatic power and guidance elements for vehicles.

Other Uses of the Bay and Shoreline

Findings and policies concerning Other Uses of the Bay and Shoreline

Findings

a. In addition to the foregoing uses of the Bay and its shores, there are at present many others including:

Housing
Public facilities (prisons, military installations, etc.)
Public utilities (power transmission lines, pipelines, etc.)
Industry not related to the Bay
Recreation facilities not related to the Bay
Commercial facilities not related to the Bay
Refuse disposal sites

b. Some uses of the shore take no advantage of the water as an asset, and some current uses abuse and despoil the water frontage.

Policies

1. Shore areas not proposed to be reserved for a priority use should be used for any purpose (acceptable to the local government having jurisdiction) that uses the Bay as an asset and in no way affects the Bay adversely. This means any use that does not adversely affect enjoyment of the Bay and its shoreline by residents, employees, and visitors within the site area itself or within adjacent areas of the Bay or shoreline.

2. Accessory structures such as boat docks and portions of a principal structure may extend on piles over the water when such extension is necessary to enable actual use of the water, e.g., for mooring boats, or to use the Bay as an asset in the design of the structure.

3. Wherever waterfront areas are used for **housing**, (a) the amount of shoreline and the surface area of the Bay should be increased to the maximum extent feasible by dredging additional channels inland from the Bay, and (b) whenever feasible, high densities should be encouraged to provide the advantages of waterfront housing to larger numbers of people. Houseboats (floating homes useable as

year-round residences) may be permitted in some areas of the Bay provided the boats (a) would not adversely effect the ecology of the Bay, (b) would not cause a harmful amount of sedimentation, (c) would either be connected to a shoreline sewage treatment system or have on-board treatment facilities acceptable to public health and water quality control agencies, (d) would require no fill except for a pedestrian walk on pilings, and (e) would be acceptable to local governments having jurisdiction over the areas in question.

4. High voltage transmission lines should be placed in the Bay only when there is no reasonable alternative. Whenever high voltage transmission lines must be placed in the Bay or in shoreline areas:

- a. New routes should avoid interfering with scenic views and with wildlife, to the greatest extent possible.
- b. The most pleasing tower and pole design possible should be used.

High voltage transmission lines should be placed underground as soon as this is technically and economically feasible.

5. Power distribution and telephone lines should either be placed underground (or in an attractive combination of underground lines with streamlined overhead facilities) in any new residential, commercial, public, or view area near the shores of the Bay.

6. Whenever waterfront areas are used for **sewage treatment or waste water reclamation plants**, the plants should be located where they do not interfere with and are not incompatible with residential, recreational, or other public uses of the Bay and shoreline.

7. New AM and short-wave **radio transmitters** may be placed in marsh or other natural areas. Whenever possible, however, consolidation of transmitting towers should be encouraged.

8. Desalinization and power plants may be located in any area where they do not interfere with and are not incompatible with residential, recreational, or other public uses of the Bay and shoreline, provided that any pollution problems resulting from the discharge of large amounts of heated brine into Bay waters, and water vapor into the atmosphere, can be precluded.

9. Pipeline terminal and distribution facilities near the Bay should generally be located in industrial areas but may be located elsewhere if they do not interfere with, and are not incompatible with, residential, recreational, or other public uses of the Bay and shoreline.

10. To eliminate any further demand to fill any part of the Bay solely for **refuse disposal sites**, new waste disposal systems should be developed; these systems should combine economical disposition with minimum consumption of land. Pending development of new waste disposal systems, immediate waste disposal problems should be solved through full utilization of existing dump sites and through development of new dump sites, if needed, in acceptable inland locations.

11. Types of development that could not use the Bay as an asset (and therefore should not be allowed in shoreline areas) include: (a) refuse disposal (except as it may be found to be suitable for an approved fill), (b) use of deteriorated structures for low-rent storage or other non-water related purposes, and (c) junkyards.

Public Access

Findings and policies concerning Public Access To the Bay

Findings

a. San Francisco Bay is one of the dominant features of the nine-county Bay Area. It has great potential for numerous forms of public enjoyment, including viewing, photography, nature study, fishing, wading, and walking, or just sitting, beside the water.

b. Until recently, there were few points of public access in the entire 276-mile Bay shoreline. While many communities have recently taken new looks at their waterfronts and have proposed new points of public access to the Bay, the full potential for access to the Bay has by no means yet been reached.

c. The public parks proposed in the Bay Plan will not all be built in the near future, and even if all were completed immediately, there would still be only a small part of the shoreline open to the public. Clearly, additional public access to the Bay is needed, and this can be provided, in part at least, by private capital in a wide variety of shoreline developments.

Policies

1. In addition to the public access to the Bay that will be provided by waterfront parks, beaches, marinas, and fishing piers, maximum feasible opportunity for pedestrian access to the waterfront should be included in every new development in the Bay or on the shoreline, whether it be for housing, industry, port, airport, public facility, or other use. If no such access can reasonably be provided, the development should not be allowed on the waterfront unless it must of necessity be there (i.e., unless it is an industry requiring access to deep water, a shipping terminal, etc.).

2. Public access should be provided into some "natural" areas retained as ecological assets, to permit study and enjoyment of these areas (e.g., by catwalks or piers in some sloughs or marshes).

3. Any permitted fills should be designed to produce a net increase in the amount of shoreline, so as to provide additional public access to the Bay.

4. Whenever public access to the Bay is provided as a condition of development, on fill or on the shore-

line, the access should be permanently guaranteed. This should be done wherever appropriate by requiring dedication of fee title or easements at no cost to the public, in the same manner that streets, park sites, and school sites are dedicated to the public as part of the subdivision process in cities and counties.

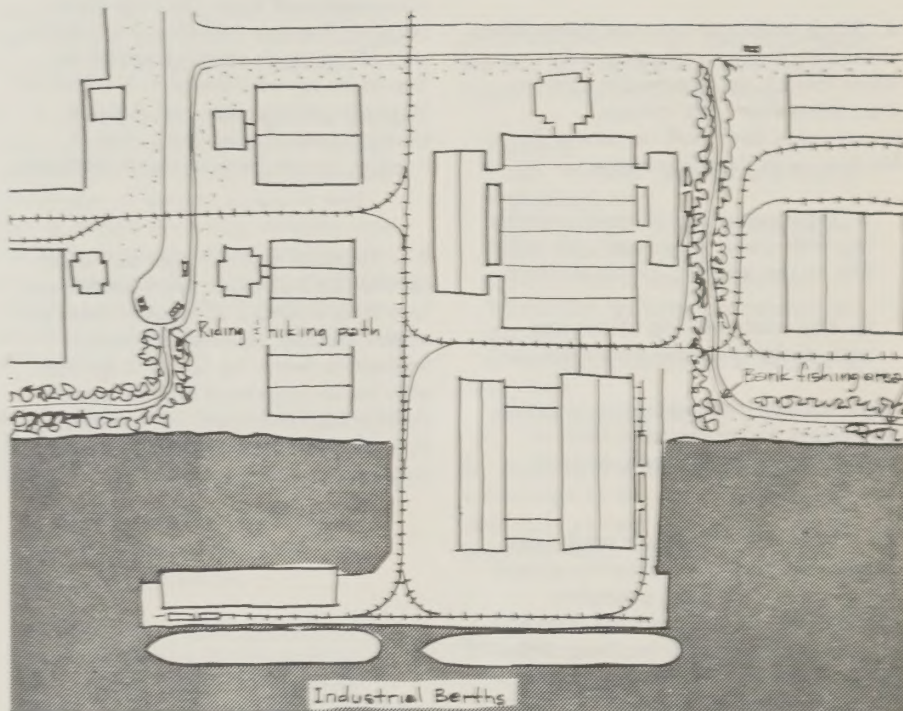
5. Roads near the edge of the water should be designed as scenic parkways for slow-moving, principally recreational, traffic. The right-of-way design should discourage through traffic and provide for safe pedestrian access to the shore.

6. Access to the waterfront should be provided by walkway, tramway, etc., if adjacent parking is not feasible or desirable.

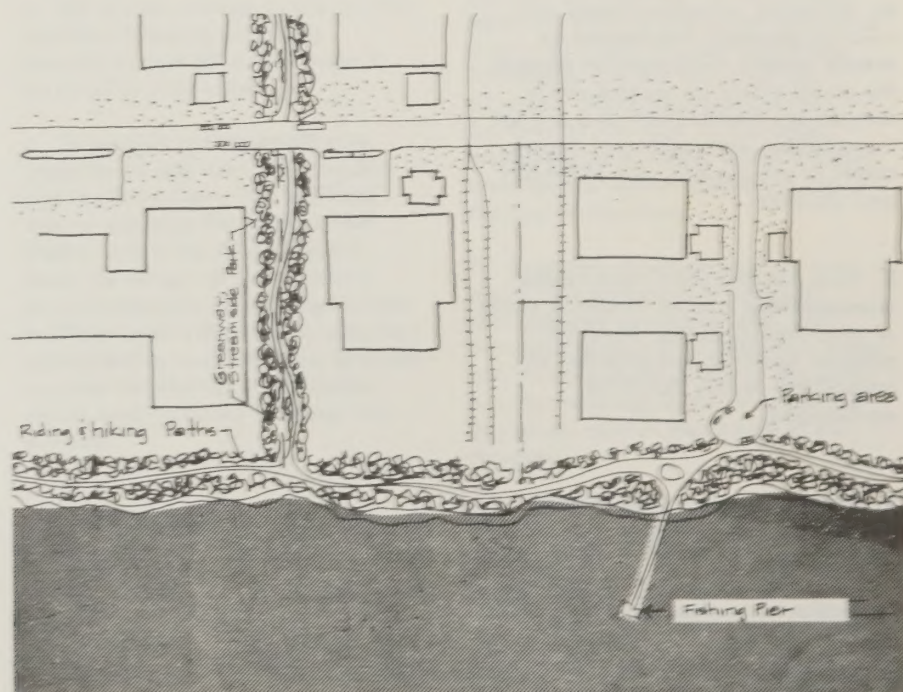
7. In some shoreline projects, a small amount of fill may be allowed if the fill is necessary—and is the minimum absolutely required—to develop the site in accordance with the Bay agency's public access requirements.

8. Local jurisdictions and the Bay agency should cooperate to link the entire series of shoreline parks and public access points to the extent feasible without additional Bay filling. Many types of connection can be employed, such as scenic drives, hiking paths, and a system of inland waterways.

9. The Bay agency should issue more detailed standards and criteria to carry out the intent of the above policies on public access to the Bay, and should publish a manual to guide developers and designers, including examples of various ways of meeting the policies, with due consideration to costs and to practical problems of maintenance, public liability, and policing.



1 Industries Requiring Direct Water Access



2 Industries Not Requiring Direct Water Access

Appearance and Design

Findings and policies concerning Appearance and Design Of Development Around the Bay

Findings

- a. Much too often, shoreline developments have not taken advantage of the magnificent setting provided by the Bay. Some shoreline developments are of poor quality or are inappropriate to a waterfront location. Over time, existing shoreline development of poor quality and inappropriate uses could be phased out or up-graded by normal market forces and by public action.
- b. Collections of debris sometimes mar the appearance of marshes, mudflats, and sloughs.
- c. The appearance of the Bay, and man's enjoyment of it as a scenic resource, contribute to the enjoyment of daily life in the Bay Area. As a special kind of open space, the Bay acts as both the unifying element of the entire Bay region and as a physical divider of its parts. The wide surface of the Bay, and the distant vistas it affords, offer relief from the crowded, often chaotic, urbanized scene and help to create a sense of psychological well-being.

Policies

1. To enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Bay Plan's General Development Guide (Appendix A).
2. All Bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay. To this end, planning of waterfront development should include participation by professionals such as landscape architects, urban designers, or architects, working in conjunction with engineers and professionals in other fields.
3. To enhance the maritime atmosphere of the Bay Area, **ports** should be designed, whenever feasible, to permit public viewing of port activities by means of (a) view points, restaurants, etc., that would not interfere with port operations, and (b) openings between buildings and other site designs that permit views from nearby roads.



Residential Area on Flat Site



Residential Area on Hilly Site

Public Access to the Bay

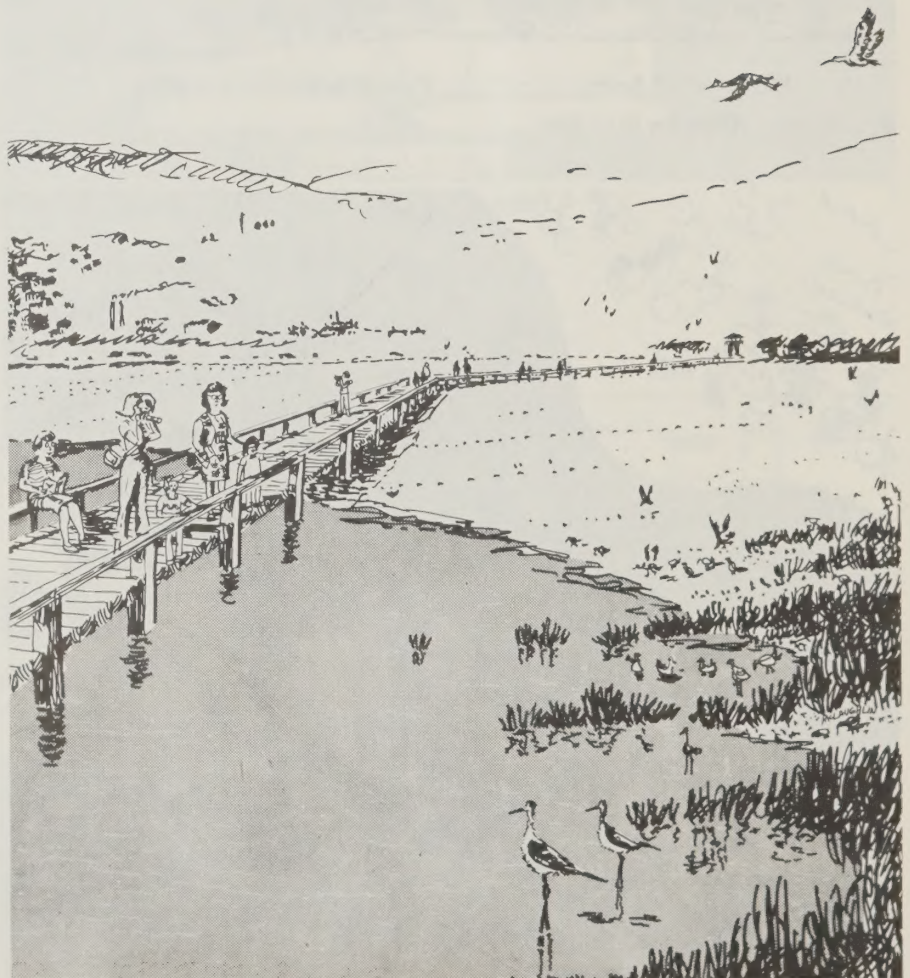
4. Towers, bridges, or other structures near or over the Bay should be designed as landmarks that suggest the location of the waterfront when it is not visible, especially in flat areas. But such landmarks should be low enough to assure the continued visual dominance of the hills around the Bay.

5. Additional surface crossings of the Bay should be avoided, to the extent possible, to preserve the visual impact of the large expanse of the Bay. The design of new crossings deemed necessary should respect the fact that the Bay consists of a series of natural "bowls" that are "closed" at each end by a constriction. The crossing should be placed whenever feasible at such "ends" between promontories or other land forms that naturally suggest themselves as connections reaching across the Bay (but without destroying the obvious character of the promontory). To the extent possible, crossings should also be of one "family" of structural types (e.g., all might be suspension bridges).

6. Access routes to Bay crossings should be designed in a manner that orients the traveler to his new direction of movement in relation to the water (as in the main approaches to the Golden Gate Bridge). Similar consideration should be given to the design of highway and mass transit routes paralleling the Bay at any elevation (by providing frequent views of the Bay or by having turns toward or away from the water made in sight of the water, if possible, so the traveler knows which way he is moving in relation to the Bay).

7. Developments near the mouth of tributary waterways should be designed to preserve the view of the juncture of the tributary with the Bay from as far upstream as the alignment of the waterway will permit, so as to preserve maximum visual contact with the Bay. Developments farther upstream, beyond the view of a tributary's mouth, should be used for purposes related to the Bay, if at all possible (e.g., marina and boat service facilities or private docks, on navigable tributaries).

8. In areas of the Bay where oil and gas drilling or production platforms are permitted, only the minimum number of platforms necessary to recover the oil or gas should be permitted, and platforms and structures on them should be no larger than necessary. All platforms and equipment on them should be painted or screened so they will be compatible with the surrounding open water, mudflat, marsh, or shore area.



**Walkways For Wildlife Observation
in Marsh and Shallow Water Areas**

9. "Unnatural" debris should be removed from sloughs, marshes, and mudflats that are retained as part of the ecological system. Sloughs, marshes, and mudflats should be restored to their former "natural" state if they have been despoiled by human activities.

10. A design review system is needed to evaluate developments that affect the appearance of the Bay. The system must have sufficient standing and influence to make it effective. Initially, (a) city and county governments, and all affected regional, state and federal agencies, should use the General Development Guide (Appendix A) for affected developments, and (b) a regional Design Review Board should review the proposed design of all projects and strive for a high level of design quality. Subsequently, the Bay agency might by ordinance adopt basic design controls upon recommendation of the Design Review Board.

11. Local governments should be encouraged to eliminate inappropriate shoreline uses and poor quality shoreline conditions by regulation and by public actions (including development financed wholly or partly by public funds). If local governments do not achieve this, the Bay agency should be able to take such actions, including financing development wholly or partly from funds at its disposal.

12. In some shoreline projects, a small amount of fill may be allowed if the fill is necessary—and is the minimum absolutely required—to develop the site in accordance with the Bay agency's design recommendations.

Scenic Views

Findings and policies concerning Scenic Views Of the Bay

Findings

a. Probably the most widely enjoyed "use" of the Bay is simply viewing it—from the shoreline and from afar. One indicator: a Bay view can add 8 to 10 per cent to the value of a home, office, or apartment building in San Francisco. And there is little question the Bay is a major visitor attraction for the tourist industry.

b. But full advantage has not been taken of the dramatic view potential from the hills surrounding the Bay, often because of poor road layout and poorly located buildings or plantings. There are some local zoning controls on building heights but there is no general attention to maximizing views from roads and to obtaining public view areas.

Policies

1. Maximum efforts should be made to provide, enhance, or preserve views of the Bay from public areas.

2. Shoreline developments should be built in clusters, leaving open area around them, to permit more frequent views of the Bay.

3. Views of the Bay from vista points and from roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water. In this regard, particular attention should be given to all areas as waterfront locations, areas below vista points, and areas along roads that provide good views of the Bay for travelers, particularly areas below roads coming over ridges and providing a "first view" of the Bay (shown in Plan map 2, Proposed Major Uses of the Bay and Shoreline).

4. Vista points should be provided in the general locations indicated in the Plan maps. Access to vista points should be provided by walkway, tramway, etc., if adjacent parking is not feasible or desirable. In some cases, exhibits, museums, or markers would be desirable at vista points to explain the value or importance of the areas being viewed.

5. Scenic parkways commanding views of the Bay should generally be encouraged in the hills above the Bay and in areas along the shores of the Bay.

6. New or remodeled bridges across the Bay should be designed to permit maximum viewing of the Bay and its surroundings by both motorists and pedestrians. Guard rails and bridge supports should be designed with views in mind.



Part V

Carrying Out the Plan

A Regional Agency is Needed

To carry out the Bay Plan effectively, a regional agency is needed. The agency should have the power to analyze, plan, and regulate the entire Bay and shoreline **as a unit**. The agency's jurisdiction should include the Bay, and limited shoreline areas in the nine Bayfront counties.

The Plan for the Bay can be carried out by either of two types of governmental agency: (1) a single-purpose agency concerned only with the Bay, or (2) a multi-purpose, limited regional government, concerned with other regional matters in addition to the Bay.

The Commission recommends that a limited regional government be created for the Bay Area. A limited regional government would (1) avoid further fragmentation of regional responsibility by forestalling the proliferation of additional special-purpose districts, (2) be able to consider the overall needs of the region as a whole, and thus minimize wasteful duplication in regional development, and (3) attract broad public attention and thus help to insure public awareness of regional problems and needs. As one of its principal assignments, a limited regional government should be required to carry out the BDCD Plan for the Bay and shoreline.

If a limited regional government is not established, the Commission recommends that a special agency be created to carry out the Plan for the Bay. To the maximum extent feasible, the special Bay agency should be organized so as to permit smooth transfer of powers to a limited regional government that might be created in the future.

(The Commission's recommendations on governmental organization to carry out the Bay Plan, together with the Commission's studies of this matter, have been submitted to the Joint Legislative Committee on Bay Area Regional Organization.)

Scope of Authority Required

Protection of the Bay and enhancement of its shoreline are inseparable parts of the Bay Plan. Clearly, what happens to the shoreline helps determine what happens to the Bay; if, for example, the relatively few shoreline areas suitable for water-oriented industry are used for housing, pressures will develop to provide new industrial land by filling the Bay. Therefore, in the public interest, the Bay agency should have adequate controls over both (1) Bay filling and dredging, and (2) Bay-related shoreline development.

Control of Filling and Dredging in the Bay

1. Permit Procedures for Filling and Dredging

Bay filling (including placement of piers, pilings, and floating structures moored in the Bay for extended periods) and Bay dredging should be controlled through a permit system. The Bay agency (whether a single-purpose agency or a part of a limited regional government) should be empowered to issue or deny permits for any filling and dredging in the Bay. Any public agency or owner of privately-held lands should be required to obtain a permit before proceeding with fill or dredging.

Permits should be granted or denied only after public hearings, and after the city or county having jurisdiction over the area of the proposed project has made its views known to the Bay agency (or has failed to do so within a reasonable period of time). Ordinarily, this process (including adequate time for investigation and analysis by the Bay agency's staff and consultants) would require no more than 60 days, but additional time should be allowed for permit applications of unusual complexity; in no case should more than six months be required, however. The Bay agency should circulate copies of each permit application to all concerned agencies and individuals and should coordinate the review process with those of the other agencies so as to minimize the time, paperwork, and cost required by all concerned.

Permits should be granted by the affirmative vote of a majority of the members of the governing body of the Bay agency. But the Bay agency should be empowered to delegate the function of holding public hearings and of granting or denying permits to the staff or to a committee of the governing body, subject in all cases to appeal to the full governing body.

The costs of processing permit applications should be borne by the applicants, not by the general public. In some cases, the costs would be nominal; in others, they might be relatively high, depending on the complexity of the work involved. The Bay agency should establish a fee schedule to cover the costs of processing permit applications.

The Bay agency should insure that work is performed in the manner and for the purposes that it was authorized. To this end, it should have the customary governmental powers to require performance bonds in appropriate circumstances, to suspend or revoke permits for violation, and to enjoin

actions not in accordance with an active permit. It should also have sufficient staff to monitor work subject to its jurisdiction, and should issue certificates of compliance upon the completion of work and prior to occupancy, just as many cities and counties do now.

The Bay agency should approve a permit application if it specifically determines that a proposed project meets the following conditions, each of which is necessary for effectively carrying out the Bay Plan.

a. Fills in Accord With Bay Plan.

A proposed project should be approved if the filling is the minimum necessary to achieve its purpose, and if it meets one of the following four conditions:

(1) The filling is in accord with the Bay Plan policies as to the Bay-related purposes for which filling may be needed (i.e., ports, water-related industry, and water-related recreation) and is shown on the Bay Plan maps as likely to be needed; or

(2) The filling is in accord with Bay Plan policies as to purposes for which some fill may be needed if there is no other alternative (i.e., airports, roads, and utility routes); or

(3) The filling is in accord with the Bay Plan policies as to minor fills for improving shoreline appearance or public access; or

(4) The filling would provide on privately-owned property for new public access to the Bay and for improvement of shoreline appearance—in addition to what would be provided by the other Bay Plan policies—and the filling would be for Bay-oriented commercial recreation and Bay-oriented public assembly purposes. The Bay agency should issue permits under this criterion provided:

(a) The proposed project would limit the use of land to be filled to: (i) public recreation (beaches, parks, etc.), **and** (ii) Bay-oriented commercial recreation and Bay-oriented public assembly, defined as facilities specifically designed to attract large numbers of people to enjoy the Bay and its shoreline, such as restaurants, specialty shops, and hotels.

(b) The proposed project would be designed so as to take advantage of its nearness to the Bay, and would provide

opportunities for enjoyment of the Bay in such ways as viewing, boating, fishing, etc., by keeping a substantial portion of the development, and a substantial portion of the new shoreline created through filling, open to the public free of charge (though an admission charge could apply to other portions of the project).

(c) The proposed private project would not conflict with the adopted plans of any agency of local, regional, state, or federal government having jurisdiction over the area proposed for filling, and would be in an area where governmental agencies have not planned or budgeted for projects that would provide adequate access to the Bay.

(d) The proposed project would either provide recreational development in accordance with the Bay Plan maps or would provide additional recreational development that would not unnecessarily duplicate nearby facilities.

(e) A substantial portion of the project would be built on existing land, and the project would be planned to minimize the need for filling. (For example, all automobile parking should, wherever possible, be provided in multi-level structures rather than in extensive parking lots.)

(f) The proposed project would result in permanent public rights to use specific areas set aside for public access and recreation; these areas would be improved at least by filling to finished grade and by installation of necessary basic utilities, at little or no cost to the public.

(g) The proposed project would, to the maximum extent feasible, establish a permanent shoreline in a particular area of the Bay, through dedication of lands and other permanent restrictions on all privately-owned and publicly-owned property Bayward of the area approved for filling.

(h) The proposed project would provide to the maximum extent feasible for enhancement of fish and wildlife resources in the area of the development.

b. Safety. A proposed project should be approved by the

Bay agency if its Fill Review Board determines that the proposed project is in accordance with the policies for Safety of Fills (page 17). The Fill Review Board should be appointed by the Bay agency, and should consist of leading professionals in the fields of geology, structural engineering, and civil engineering (with specialty in soils engineering).

c. Public Access. A proposed fill project should increase public access to the Bay to the maximum extent feasible, in accordance with the policies for Public Access to the Bay (page 29).

d. Effects on the Bay. A permit for a proposed fill, dike, or pier, should be approved if it has been evaluated on the basis of the policies on Water Pollution (page 10), Smog and Weather (page 10), Water Surface Area and Volume (page 11), and Marshes and Mudflats (page 11), and modified as necessary to minimize any harmful effects. Proposed dredging should be in accordance with the Dredging policy (page 13).

e. Valid Title. Because there is some question as to the conditions under which some private parties originally received lands in the Bay, a private claimant should be required to show that he has a valid title to any Bay lands proposed for filling. Ordinarily, this could be done by submission of a current title insurance report including the derivation of title from original sale by the State. Where titles are disputed, the legal issues should be resolved as soon as possible by court action or other appropriate steps.

f. Public Trust. Many private owners of Bay lands hold title subject to rights of the public, derived from English common law and the California Constitution, as to use of waterways for commerce, navigation, and fishing. These rights, sometimes called the "public trust" for commerce, navigation, and fishing, are the subject of considerable legal debate, and court tests may be required to determine their practical significance. Any necessary court tests should be completed as soon as possible; in the meantime, an applicant for a fill permit should be required to show *either* that the public trust does not apply to his lands, or that the filling would be consistent with the trust.

g. Appearance. Plans for a proposed fill project should be submitted to a Design Review Board appointed by the Bay agency and consisting of professionals in the fields

of urban design, architecture, and landscape architecture. The Design Review Board should determine whether the proposed project is in accordance with the policies for Appearance and Design of the Bay and shoreline (page 31), and should report its recommendations to the governing body of the Bay agency before a permit is issued. The jurisdiction over appearance and design should be only advisory, but the Bay agency should encourage local governing bodies to exercise controls in accordance with the policies on Appearance and Design and the Design Review Board's recommendations.

2. Permit Decisions

If a permit application meets the standards listed above, a permit should be granted. If the proposal does not meet these standards, a permit should not be issued. In some cases, however, a permit could be conditionally approved subject to the applicant's later meeting clearly-specified requirements relating to one or more of the seven standards above. In other cases, an applicant might be able to change his proposal to conform to the Bay Plan policies, and he could then reapply.

3. Area of Jurisdiction

The Bay agency should control filling and dredging in San Francisco Bay. The Bay should be defined as extending from the Golden Gate (Point Bonita-Point Lobos) and the southern end of the Bay to the eastern end of Suisun Bay and Montezuma Slough (a line between Stake Point and Simmons Point, extended northeasterly to the mouth of Marshall Cut)—and including the submerged lands and tidelands that are part of the open Bay waters, all sloughs (as shown on the current U.S. Geological Survey maps as of September 1, 1968), and also all marshlands subject to tidal action up to 5 feet above mean sea level (the general area included in the definition is colored light blue on the Plan maps). The Bay agency should also control filling and dredging in creeks and other tributaries to the Bay (other than those east of the Simmons Point-Stake Point-Marshall Cut line) as far upstream as they are determined to be a vital part of the ecological system of the Bay, but in no event farther upstream than the mean high tides extend. The few tributaries proposed to be within the jurisdiction of the Bay agency are listed on the Bay Plan map notes and shown on the Plan maps.

The Bay agency should be enabled, by resolution, to relinquish jurisdiction over any part of the Bay or any

particular reach of a tributary to the Bay that it finds, after scientific study, to be of little or no ecological value.

Developing the Bay and Shoreline to Their Highest Potential

1. Necessity for Limited Shoreline Jurisdiction

The Bay agency should have limited jurisdiction over shoreline areas, as defined below. Local governments should continue to regulate shoreline areas, subject only to the Bay agency's guidelines. This limited Bay agency jurisdiction is necessary to reduce pressures for Bay filling that would result from poor use of available shoreline land, and to insure that public access to the Bay is provided wherever feasible. The Bay agency should therefore be empowered to (1) designate and reserve shoreline lands needed for priority uses—ports, water-related industry, airports, wildlife areas, and water-related recreation; (2) require as much public access to the Bay in new projects as is feasible; and (3) encourage attractive and interesting shoreline development.

Failure to achieve these objectives will either (1) reduce the amount of water-related industry, ports, airports, and water-related recreation that the Bay Area can ultimately accommodate, with resulting damage to the region's economy and quality of life, or (2) create unnecessary pressures to fill the Bay to provide more land for these purposes.

2. Purposes for Which a Permit May be Issued

Shoreline development should be controlled through a permit system. This will insure that the Bay agency has full knowledge of all shoreline developments and can exercise its limited jurisdiction regarding them. (The alternative would leave enforcement of Bay agency policies to the many local governments having jurisdiction over shoreline areas, with the Bay agency able to intervene only after a violation of its standards took place.)

The Bay agency (whether a single-purpose agency or a part of a limited regional government) should therefore be empowered to issue or deny permits for shoreline development.

The Bay agency should approve a permit for shoreline development if the agency specifically determines that the proposed project is in accordance with the standards listed below for (a) use of the shoreline, (b) provision of public access, and (c) advisory review of appearance.

a. **Use of Shoreline.** The Bay agency should designate three categories of shoreline area, and should apply standards for each as follows:

(1) **Priority shoreline land uses** are listed below (not necessarily in order of importance). The Bay agency should designate and reserve the shoreline areas needed for each priority use, in a manner analogous to zoning, and should carry out the appropriate shoreline development policies:

(a) Ports (in accordance with policy on page 19).

(b) Water-related Industry (in accordance with policy on page 17).

(c) Water-oriented Recreation (in accordance with policy on page 23).

(d) Airports (in accordance with policy on page 21).

(e) Wildlife Areas (in accordance with policy on page 9).

(2) **Salt ponds and other managed wetlands** (as shown on the Bay Plan maps) should be used in accordance with the policies on page 27).

(3) **All other shoreline areas** should be used in any manner that would not adversely affect enjoyment of the Bay and shoreline by residents, employees, and visitors within the area itself or within adjacent areas of the Bay and shoreline, in accordance with the policies for Other Shoreline Uses on page 28.

b. **Public Access.** The Bay agency should insure that each new shoreline development increases public access to the Bay to the maximum extent feasible, in accordance with the policies for Public Access to the Bay on page 29.

c. **Appearance.** The Bay agency should submit plans for proposed shoreline improvements to its Design Review Board (described on page 33). The Board should evaluate each set of plans in light of the policies for Appearance and Design of the Bay on page 31, and should be empowered to make its recommendations public, but these recommendations should be advisory only, and not of themselves be grounds for denying a permit.

3. Permit Procedures

Any public agency or private owner holding shoreline lands should be required to obtain a permit before proceeding with any major shoreline development.

Permits should be granted or denied only after public hearings, and after the city or county having jurisdiction over the area of the proposed project has made its views known to the Bay agency (or has failed to do so within a reasonable period of time). Ordinarily, this process (including adequate time for investigation and analysis by the Bay agency's staff and consultants) would require no more than 60 days, but additional time should be allowed for permit applications of unusual complexity; in no case should more than six months be required, however. The Bay agency should circulate copies of each permit application to all concerned agencies and individuals and should coordinate the review process with those of the other agencies so as to minimize the time and paperwork required by all concerned.

Permits should be granted by the affirmative vote of a majority of the members of the governing body of the Bay agency. But the Bay agency should be empowered to delegate the function of holding public hearings and of granting or denying permits to the staff or to a committee of the governing body, subject in all cases to appeal to the full governing body.

The costs of processing permit applications for shoreline developments should be borne by the applicants, not by the general public. In most cases, processing costs would be small, and the Bay agency should establish a fee schedule to cover these costs.

The Bay agency should insure that work is performed in the manner and for the purposes that it was authorized. To this end, it should have the customary governmental powers to require performance bonds in appropriate circumstances, to suspend or revoke permits for violations, and to enjoin actions not in accordance with an active permit. It should also have sufficient staff to monitor work subject to its jurisdiction, and should issue certificates of compliance upon the completion of work and prior to occupancy just as many cities and counties do now.

4. Extent of Shoreline Jurisdiction

For **priority uses** (ports, water-related industry, airports, wildlife areas, and water-related recreation) the Bay agency's jurisdiction should encompass enough shoreline land to

make an effective use of each prime site, and should encompass parcels of land of varying sizes and shapes as necessary to include all of each prime site. Initially, the Bay agency should have the jurisdiction recommended in this report over the priority use areas as shown on the Bay Plan maps.

For all **other shoreline areas**, the Bay agency's jurisdiction should extend inland only far enough to assure that no harmful uses are made of the shoreline, that attractive design of shoreline development is encouraged, and that public access is provided wherever feasible. This jurisdiction would most logically apply to the whole of each parcel of land fronting on the Bay that would ordinarily be the basic building or development unit, i.e., the whole of an owner's holding, whether it be a small lot for one house or a large parcel for an extensive residential or commercial development.

Therefore, this jurisdiction should extend inland from the Bay to include each whole parcel of land (or group of parcels in the same ownership and use) bordering the Bay as of September 17, 1965 (the effective date of the BCDL), or should extend inland a distance of 1,000 feet, *whichever is less*. The Bay agency should be enabled to declare by resolution that it will not exercise this jurisdiction over any particular area that it finds to be physically separated from the Bay shoreline and of no regional concern to the Bay. (In the case of unusually large parcels of land, extending inland a great distance, jurisdiction for shoreline development purposes need not cover the entire parcel to be effective, hence the 1,000 foot limitation. Similarly, in some cases even a smaller distance from the shoreline will be clearly beyond any relationship to the water, hence the option for the Bay agency to exclude areas from its jurisdiction.) This jurisdiction of the Bay agency should extend inland only from the shores of the Bay (including sloughs) and not from the shores of any tributaries to the Bay (even those in which control of filling and dredging is being exercised).

5. Inland Advisory Role

The Bay agency should have the specific right and duty to advise publicly on all development proposals, proposed legislation, or other measures that, in the judgment of the Bay agency, would affect San Francisco Bay. Such measures would include (for example) reserving inland industrial sites, developing or expanding inland airports, and any other steps that would relieve development pressures

on the Bay; and steps necessary to preserve and enhance scenic views of the Bay from public vista points, scenic roadways and trails, and to preserve natural landmarks such as nearby hills that provide scenic views from the Bay. The Bay agency should establish a system whereby information is exchanged between the Bay agency and local, state, and federal governments as to inland proposals affecting the Bay.

6. Regional Development Policies

Many regional matters, such as air pollution control, regulation of water quality, planning and construction of waste disposal facilities, airport development, and regional transportation, are directly related to the future of the Bay. Some of these regional matters are now within the jurisdiction of state and regional agencies, but others are not now being dealt with at all on a regional basis. Some or all of these regional matters could be made the responsibility of a limited regional government, which would in addition carry out the Bay Plan, but obviously they could not be made the responsibility of a single-purpose Bay agency. In any event, however, it is essential that many regional policies directly related to the Bay be carried out if the Bay Plan is to be effective. For example:

- a. Water quality should be maintained in accordance with the policy on Pollution (page 10).
- b. Port planning and development should be carried out in accordance with the policy on Ports (page 19).
- c. Airport planning and development should be carried out in accordance with the policy on Airports (page 21).
- d. Views from vista points and from public roads should be protected and scenic roads and trails should be built in accordance with the policy on Scenic Views (page 33).
- e. Inland industrial sites should be provided in accordance with the policy on Water-related Industry (page 18).

In addition, study should be given to whether a new policy is needed on property tax levels and distribution of property tax revenues. Present dependence of many communities on the property tax causes competition for industry, a high (net) property-tax-producing use. This may lead to pressures for industrial development in certain areas where more fill is required than would be required in other areas suitable for the same

industry. And competition for property tax base may have other unfortunate results. Subjects to be explored would include reduction in percentage of local government revenues derived from property taxes, and formulas for sharing property tax revenues on some basis of comparative need.

Applying and Amending the Bay Plan

The Bay agency should be directed to carry out the Bay Plan, i.e., to guide future development of the Bay and shoreline in accordance with the Bay Plan policies and Bay Plan maps.

Because the policies and maps are necessarily general in nature, the Bay agency should be authorized to clarify, interpret, and apply them as necessary. The agency should be specifically empowered to issue regulations containing more detailed standards and procedures based on the Plan policies, to assist in preparation of specific plans for shoreline areas, and to publish information to assist planners, architects, and engineers in the design of projects affecting the Bay.

In addition, over a period of time it may be expected that new information will come to light and that development trends will not precisely follow predictions made in 1968. The Bay Plan policies are intended to be comparable to the constitution or charter of a governmental body; i.e., to serve as guidelines under varying circumstances, and to be changed infrequently. However, application and interpretation of these policies, as shown on the Bay Plan maps, may need adjustment over the years. The Bay agency should therefore be specifically empowered to amend the Bay Plan, in accordance with the following procedures:

1. The Bay agency should be directed to make continuing studies of any matters related to the Bay that, in the judgment of the Bay agency, are necessary to keep the Bay Plan policies and Bay Plan maps up to date.
2. The Bay agency should be required to conduct a public hearing on any proposal to change the Bay Plan policies or the Bay Plan maps.
3. The Bay agency should be able to amend the Bay Plan policies upon the affirmative vote of two-thirds of the members of its governing body, such vote not to be taken less than 90 days following public notice of the proposed policy amendment. The Bay agency should be able to amend the Bay Plan maps upon the affirmative vote of a majority of the

members of its governing body after reasonable public notice.

4. The Bay agency should state publicly the reasons for its decision in each case regarding a proposed change in Bay Plan policies or Bay Plan maps.

The Bay Plan policies and maps permit minor fills where necessary to improve shoreline projects, and also permit minor shoreline construction, without amending the Plan. Any change in either policies or maps would therefore necessarily involve a project of sufficient importance to justify careful study and a formal amendment process that includes public hearings.

Costs of Carrying Out the Bay Plan

Funds to carry out the Bay Plan are needed (1) to finance development of the Bay and shoreline to their highest potential, and (2) to pay the operating costs of the agency designated to carry out the Bay Plan. If it were desired to compensate private owners of Bay lands that cannot be filled under the Plan, additional funds would be needed for this purpose.

1. Development Costs

The Bay Plan proposes development of ports, water-related industry, airports, wildlife areas, and water-related recreation. Some of this development can and should be financed by private investment, but in other cases public funds will be needed.

Industrial growth along the shoreline will, over the next 50 years, require the private investment of many millions of dollars. Expansion of existing port and airport terminals, and creation of new ones, will require both public and private investment; however, these terminals generate revenues that can repay the private investment and at least part of the public investment.

Providing waterfront parks, beaches, and other recreational facilities will require substantial public financing. Private development of shoreline recreation should be vigorously encouraged, and in some cases, such as marinas and the Marine World in Redwood City, private investors will be able to provide various types of recreation. Even with large-scale private investment in recreation, however, public funds will still be needed to purchase lands for public beaches, parks, fishing piers, etc., and to develop these areas. (Public funds will also be needed to establish wildlife areas and may also be needed to assist in providing public access and improving the appearance of many parts of the shoreline.)

The Bay Plan maps show some 5,800 new waterfront acres of particular importance for recreation to be acquired (plus some 4,000 acres of land suitable for recreational development if eventually released by the military), and 1,600 acres of new wildlife areas. The time and funds available to BCDC have not permitted parcel-by-parcel appraisals of the value of the 5,800 acres of recreational land or the 1,600 acres of proposed wildlife refuges, but on the basis of county assessors' records, the purchase price could be estimated at \$30–50 million. If present inflationary trends continue, however, this cost would probably increase every year. And in addition to the funds necessary to acquire land, money would be needed to develop beaches, parks, etc., on this land.

In general, high priority should be given to purchasing land, so it can be reserved for recreational development. But in the immediate future, top priority, and the first \$3–5 million in recreational funds available, should be used to build fishing piers, beaches, and other shoreline recreational facilities in urban areas where large concentrations of persons live near the Bay but are presently unable to use or enjoy it for recreation.

Some of the waterfront recreational lands and wildlife areas will undoubtedly be purchased by various units of federal, state, and local government, through their existing park and recreational programs. But additional efforts will still be needed; it appears reasonable to assume that existing programs will buy no more than half of the needed lands. Purchasing the remaining lands will probably require a regional program that could be made the responsibility of a limited regional government, or of a special-purpose recreational agency, or of the Bay agency.

Similarly, a program of public assistance to improve access and appearance on parts of the Bay shoreline that are developed badly, where wholly private improvement is not economic or not forthcoming, would also require some action by a regional agency to supplement local programs.

Whichever type of agency is chosen, it will need adequate funds to acquire land and to finance development in whole or in part where necessary for public recreation and for wildlife refuges or to improve public access and appearance. It will also need the power of eminent domain. And perhaps the Bay agency will need the power to initiate redevelopment projects for specially difficult shoreline areas where local governments are unable to accomplish such redevelopment and where no dislocation of any significant numbers of residents would occur.

Sources of Funds for Development.

Funds for recreational development could be derived from several sources, including various programs of the federal and state governments, but there would still be a need for local (regional) funds. Most federal and state grants (for example, the Federal Land and Water Conservation Fund and the open space program of the Federal Department of Housing and Urban Development) are given only on a matching basis, i.e., \$1 of federal funds for each \$1 of local funds. A regional bond issue would be a logical source of funds, both for direct purchase of recreational land and for local matching funds. The chances for passage of such bonds would increase materially if the bonds could be repaid from funds other than property taxes, and if, as is the case with State bond issues, a simple majority vote, rather than a two-thirds majority, were sufficient for passage.

Funds for improving public access and the appearance of existing shoreline areas and for removing incompatible development could be derived from many of the same sources. A major additional source could be the financing available for urban renewal projects—that is, Department of Housing and Urban Development grants on a two-thirds federal, one-third local basis. Most shoreline renewal projects would result in creation of properties with amenities such as views of the Bay and access to the water. A local government or the Bay agency, whichever sponsored the shoreline renewal project, could sell such lands for uses appropriate to the location and thereby recoup part or all of the public investment in the renewal area. Thus, funds available for this purpose would become in whole or in part revolving, and available for repeated use to improve the shoreline.

2. Administrative Costs

Carrying out the Bay Plan will require, as a minimum, (a) a planning staff to revise the Plan as necessary and keep it up to date, and to assist local governments in detailed planning of shoreline areas, (b) a staff to process permit applications and make the necessary inspections to insure that construction is in accordance with permits issued, (c) consultant help—primarily in the fields of engineering and ecology—to help with future planning and permit processing, (d) engineering review and inspection, to carry out recommendations of the Fill Review Board, (e) attorneys, appraisers, and other technical assistance in the acquisition of any lands bought for recreation and for wildlife preserves, and (f) other normal

administrative expenses, such as printing, postage, and office rent.

These costs would differ somewhat depending upon whether the agency designated to carry out the Bay Plan is (1) a single-purpose district such as the Bay Area Air Pollution Control District, (2) a State-financed agency such as the BCDC, or (3) a department of a limited regional government. The difference in costs is due primarily to the potential economies available to a general-purpose government, e.g., use of a motor pool, leased telephone lines, centralized personnel and accounting services, etc.

Based on the considerations outlined above, it appears that the annual costs of effectively carrying out the Bay Plan would be about \$400–500,000 per year. This is higher than the budget of the BCDC (which has averaged about \$225,000 per year) because of the additional responsibilities the Bay agency would have.

Sources of Funds for Administrative Costs.

If the agency designated to carry out the Bay Plan were a State agency, presumably it would receive an appropriation annually from the State General Fund. If the agency were an independent special district, such as the Bay Area Air Pollution Control District, it could be empowered to levy a small property tax. A tax of 1¢ per \$100 of assessed valuation in the nine-county Bay Area would now produce about \$1 million in revenue (and would produce more each year as valuations increase); thus a tax of ½¢ might suffice for operating expenses. If the Bay agency were part of a limited regional government, it would presumably receive most if not all of its financial support from the regional government; a broader range of tax sources (such as regional sales, income, or excise taxes) could presumably be made available to a limited regional government than to a special-purpose Bay agency.

3. Possible Compensation Costs

The Bay Plan does not provide for compensation of owners of lands in the Bay, for several reasons:

a. Many owners of parts of the Bay will have an opportunity to make some economic use of their holdings within the Bay Plan policies, i.e., they will be able to develop their shoreline property and some of their Bay holdings for purposes directly related to the Bay—ports, water-related industry, and water-related recreation—or for Bay-oriented commercial recreation and public assembly.

b. Although court clarification is needed, it appears that at least some owners of property at the bottom of the Bay hold their parcels subject to a public trust entitling the public to use water areas for commerce, navigation, and fishing. These owners would also not be entitled to compensation, because they have no absolute “right” to develop their properties.

c. Good arguments have been made that an owner of a part of the Bay does not have a right to either fill or be compensated. The owners of Bay property bought land under water, not ordinary dry land. Many, if not all, had at most a speculative belief that at some future date they could obtain the necessary governmental permissions, complete the expensive, necessary engineering and filling, and then lease, sell, or use the property profitably; due to the high cost of filling, Bay parcels in their original condition were ordinarily purchased for a fraction of the cost of uplands in similar locations. According to one of the nation’s foremost experts on the law of public land use regulation, the courts would probably uphold a statute declaring that privately-owned property in the Bay could not be filled—and that the owners were not entitled to compensation as a result of this regulation. The legal basis for such a statute would take into account the overwhelming public interest in preserving the Bay for future generations, the often-low prices paid for underwater property initially (and the often-low taxes paid since), the special and expensive preparation that has to be made before Bay property can be built upon, and the precedents in zoning and other land use regulations that may reduce property values but do not compensate owners.

The amount of money that would be required to compensate owners cannot be determined with any precision, because the value of property in and adjacent to the Bay varies widely (sale prices from 1960 to 1967 ranged from \$150 to about \$22,000 per acre) and because some owners would be permitted to develop and receive some economic return under the Plan policies, and would therefore not be entitled to compensation. Nevertheless, for purposes of estimating, it is worth noting that about 57,000 acres of the Bay are in private ownership; at an average price of \$500 per acre, the total purchase price would be some \$28.5 million; at an average price of \$5,000, the total price would be about \$285 million. This higher figure is reasonably in line

with the "full market value" of all privately-owned property wholly or partly in the Bay, as determined from the records of the nine Bay Area county assessors. Based on assessors' records, the current total value is about \$180 million; it appears reasonable to increase that figure by about one-third, however, to reflect the fact that unimproved land is apt to be valued for tax purposes somewhat below its actual market value. Such an adjustment would give a total estimated value of some \$240 million.

Possible Sources of Funds for Compensation Costs. Various Federal programs have money available for purchase of open space and conservation lands, but as noted above these generally require matching funds. Matching funds would be necessary in large amounts; even assuming funds from local governments, private foundations, and some gifts, additional sources would still be needed. As in the case of funds for recreational lands, a regional bond issue might be the most appropriate means of raising these funds, and the success of such a bond proposal might well depend on (1) whether the bonds were to be repaid from property taxes or from other sources of revenue, and (2) whether the bonds required a two-thirds majority vote for approval, or only a simple majority.

Further Research

The Bay Plan is based on the best information available. But new information is constantly being produced. Therefore, the Plan should be continually reviewed, and amended as necessary, in light of the further information that may become available as to various aspects of the Plan. The Bay agency should take the lead in further research on topics such as the following (which are in addition to specific research suggestions listed in other sections of the Plan):

1. Identification of specific diked-off areas which, if reopened to the Bay, would significantly improve water circulation.
2. The feasibility of an intra-regional water transportation system for containerized freight.
3. A program for gradually phasing out and relocating marginal and inappropriate developments occupying land needed for water-related uses.
4. Determination of the effects of specific fills on the climate of surrounding areas and the region.
5. Detailed mapping of fills, soils, and geology of the Bay and shoreline,

with special reference to engineering characteristics, to be used as a basis for establishing risk classification zones.

6. The economic importance, future growth, and requirements of airport-oriented industries.
7. The effect upon marshland productivity and particular species of fish and waterfowl of salinity changes resulting from public works.
8. The potential of the Bay system as a commercial fishing area.
9. New methods of sedimentation control in the Bay through upstream improvements and new dredging techniques.
10. The specific effects of urban development on the wildlife habitat value of Baylands nearby.
11. Means of disposing of or economically utilizing spoil from channel-dredging projects, to reduce pressures to fill marshlands and tidelands with dredged mud.
12. Determining, if possible, the mathematical relationship between a particular amount of fill and the reduction in the Bay's waste-assimilative capacity.
13. Developing more detailed standards and criteria to carry out the intent of the policies on public access to the Bay, with due consideration to practical problems of maintenance, public liability, and policing.
14. Developing more detailed standards and criteria to carry out the intent of the policy that shoreline areas "be used in any manner that would not adversely affect enjoyment of the Bay and shoreline by residents, employees, and visitors within the area itself or within adjacent areas of the Bay and shoreline."



Part VI

The Plan Maps

The maps that follow are an integral part of the Bay Plan. They are based on—and show how to apply—the Bay Plan policies.

All areas of the Bay subject to tidal action (and thus proposed to be subject to the jurisdiction of the future Bay agency for control of filling and dredging) are shown on the maps in light blue. Similarly shown in light blue are certain tributaries in which filling and dredging are also proposed to be controlled because of their ecological importance.

All shoreline sites designated for priority uses (as identified in the Bay Plan policies) are indicated on the Plan maps. Development of these sites should be governed by the Bay Plan policies for each specific use. Development of shoreline areas not proposed for any specific use should be consistent with the Bay Plan policies for Other Shoreline Uses.

Bay Plan policies for which precise areas cannot be mapped—for example, policy statements as to proposed Bay or shoreline freeways—are printed on the maps in bold type.

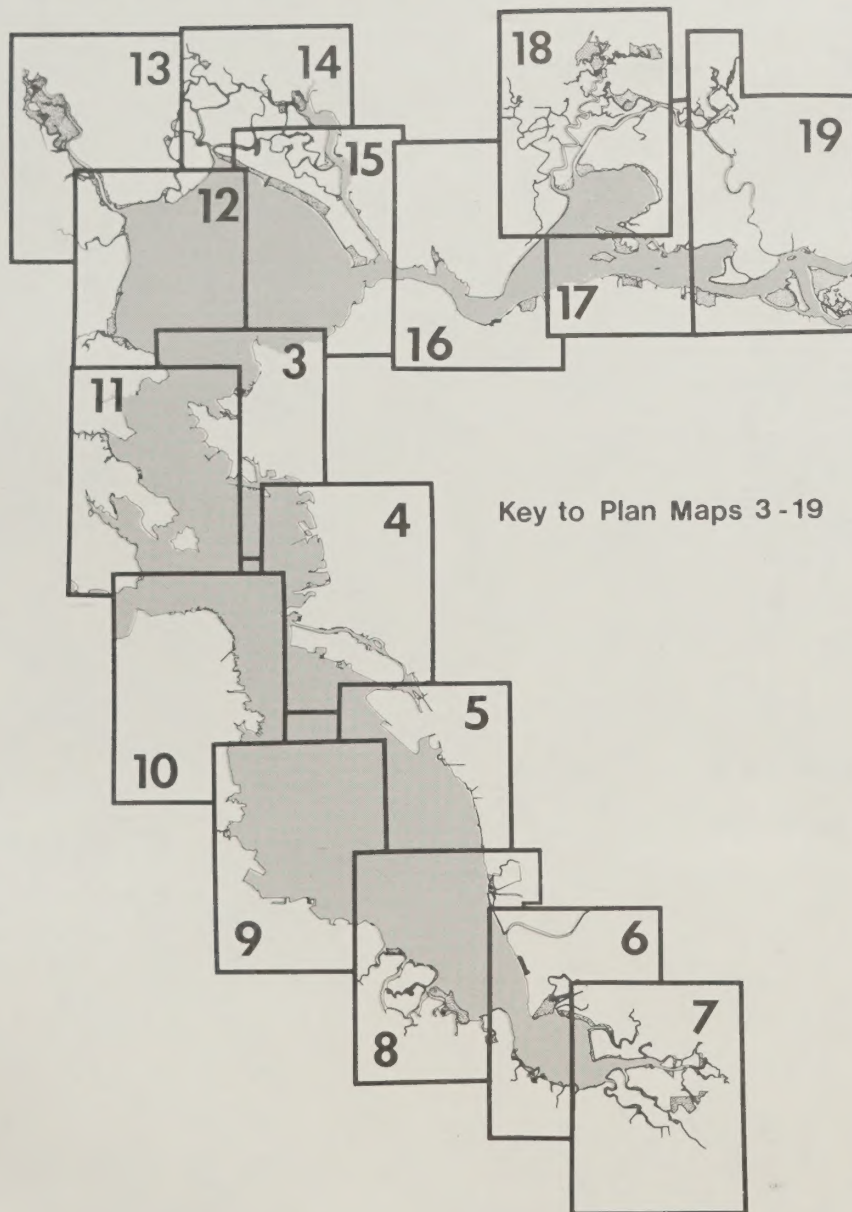
Comments that are **not** part of the Bay Plan policies—for example, suggestions for further study, clarification of policy and alternative proposals—are printed in italic type. **Comments in italic type are not intended to be enforceable policies of the Bay agency.**

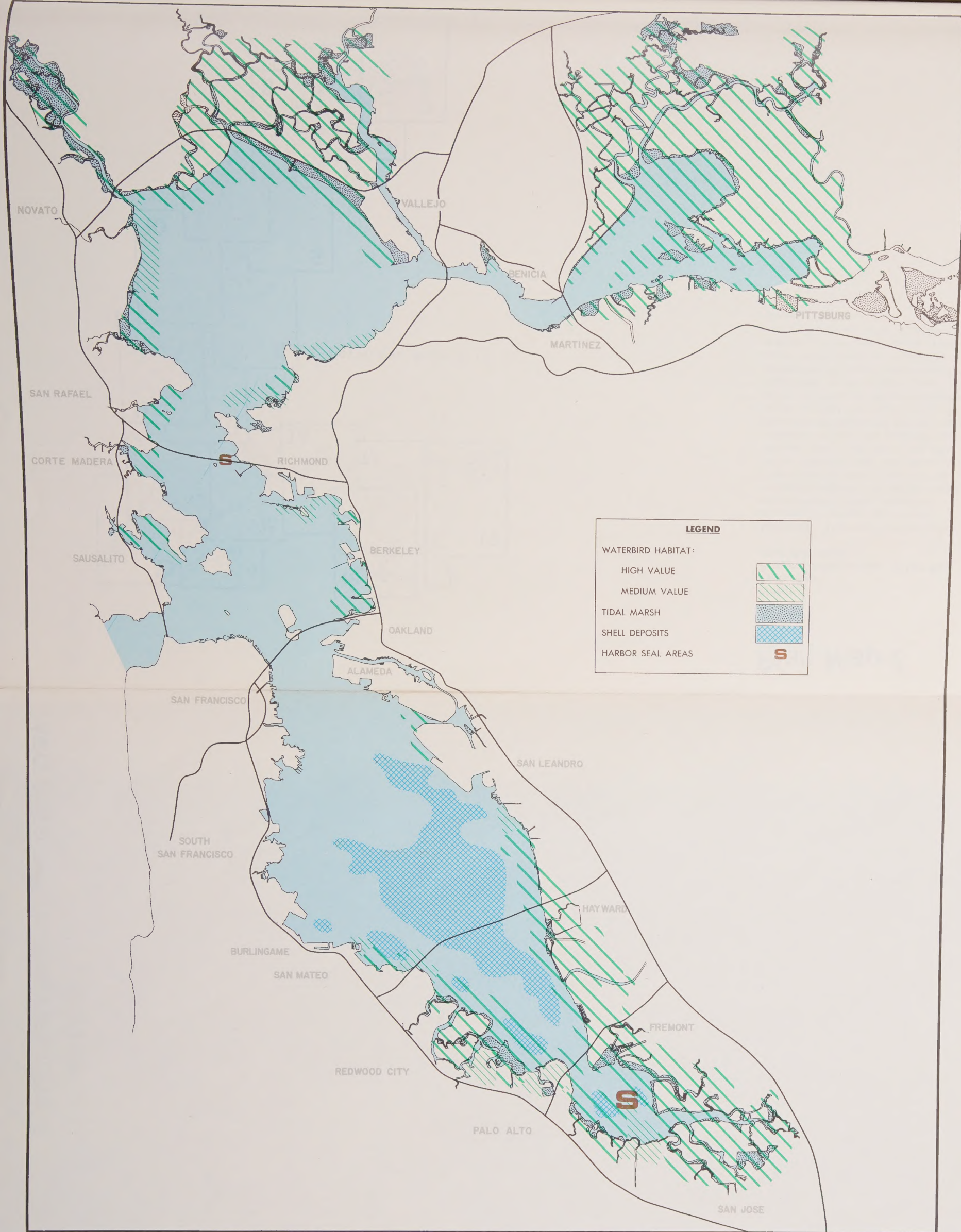
Plan Map 1

Notes to Plan Map 1 Natural Resources of the Bay

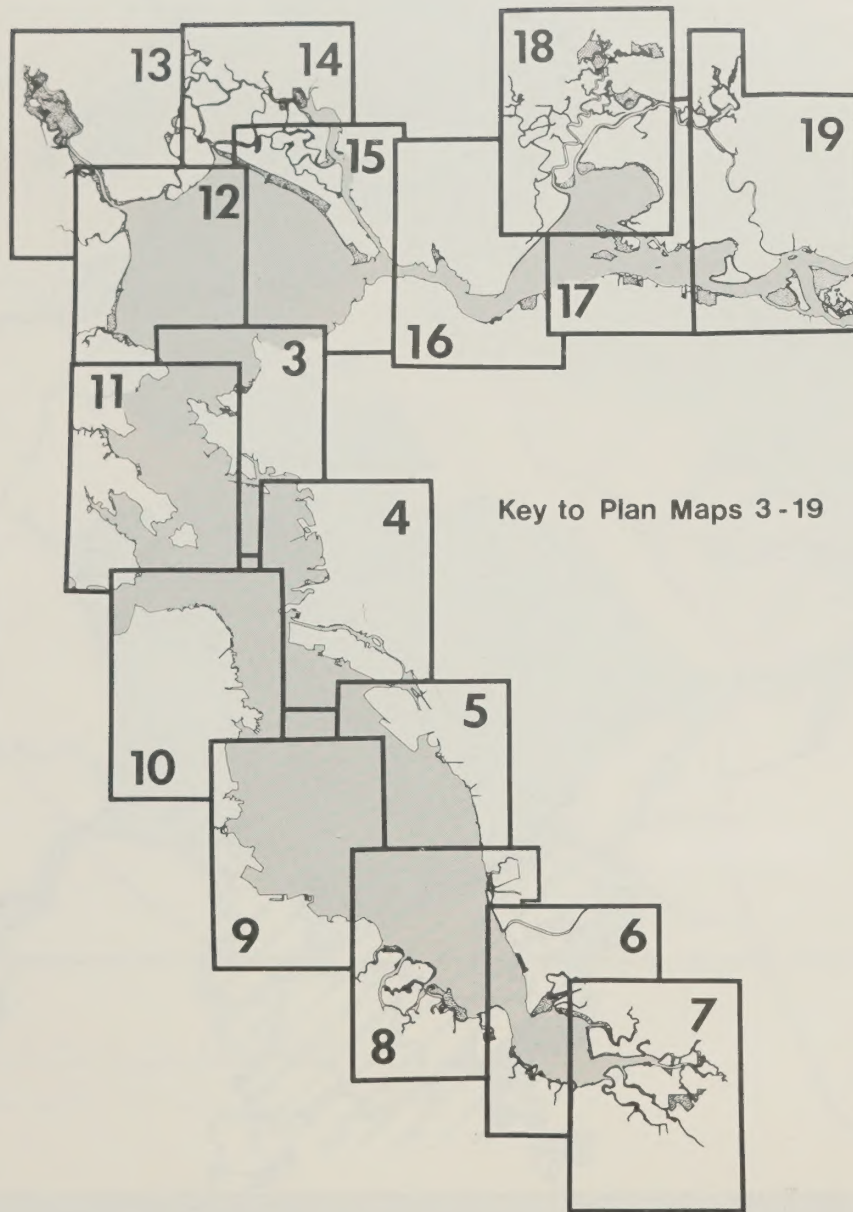
Habitat Values. Plan map shows fish and wildlife habitat areas rated as "high value" and "medium value" by State Department of Fish and Game. Other areas have value as habitat, but lesser value than the portions marked.

Shell Deposits. Oyster shells dredged primarily for use in manufacturing cement.





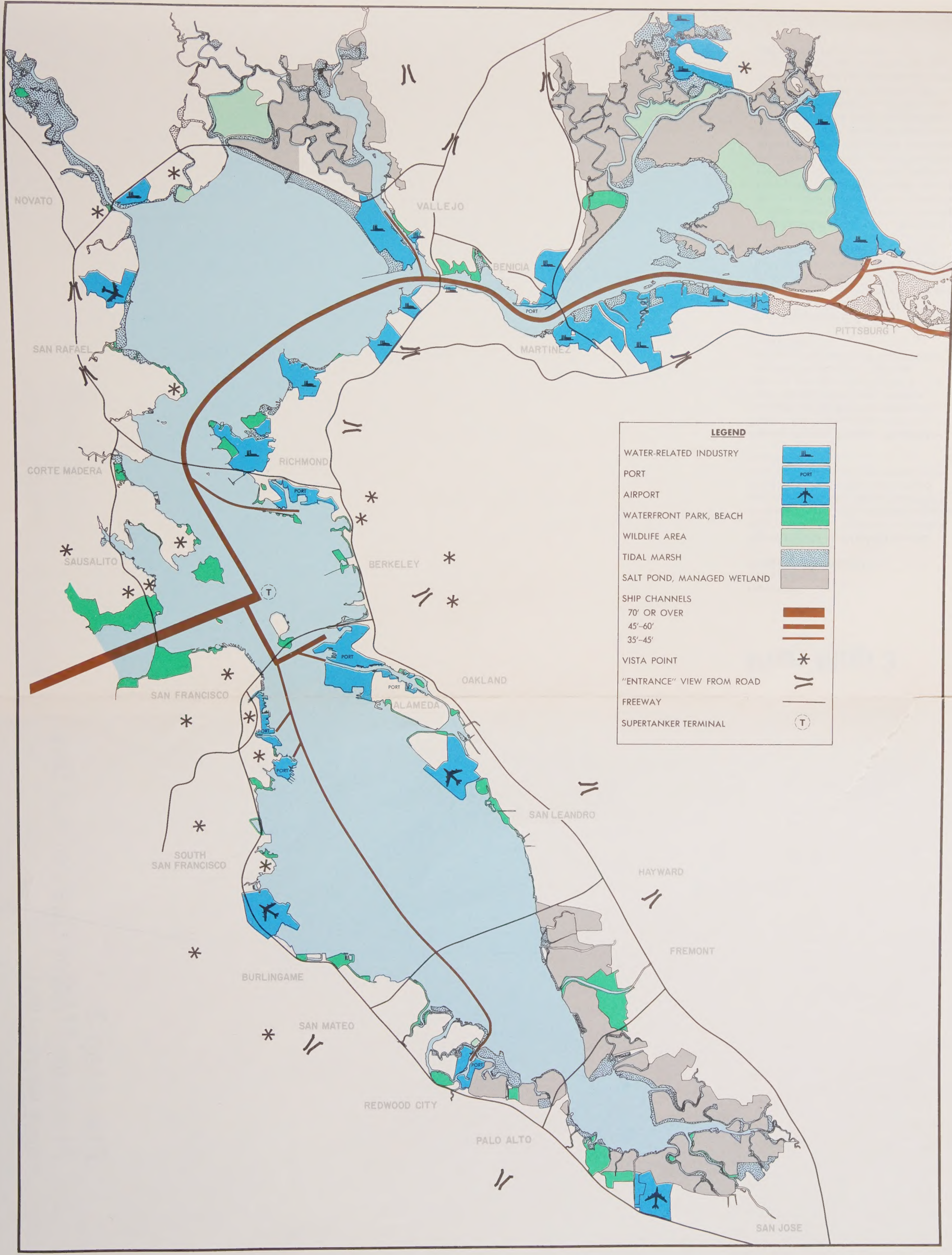
Plan Map 2



Key to Plan Maps 3 - 19

Notes to Plan Map 2 Proposed Major Uses of the Bay and Shoreline

General. This map shows all areas proposed for priority uses—ports, water-related industry, waterfront recreation, airports, and wildlife areas. These areas are shown in greater detail on following maps. Also shown on this map are: (1) salt ponds and other managed wetlands, (2) proposed main ship channel depths and possible super-tanker terminal in accordance with the policy on Ports; and (3) important vista points and "entrance views" (first views of the Bay from roads through passes in hills) that are intended for protection in the same manner as other view points shown on the detailed maps.



LEGEND

WATER-RELATED INDUSTRY	
PORT	
AIRPORT	
WATERFRONT PARK, BEACH	
WILDLIFE AREA	
TIDAL MARSH	
SALT POND, MANAGED WETLAND	
SHIP CHANNELS	
70' OR OVER	
45'-60'	
35'-45'	
VISTA POINT	
"ENTRANCE" VIEW FROM ROAD	
FREEWAY	
SUPERTANKER TERMINAL	

Plan Map 2
PROPOSED MAJOR USES OF
THE BAY AND SHORELINE

Plan Map 3

Notes to Plan Map 3 Richmond to Berkeley

Point Pinole to Wildcat Creek.

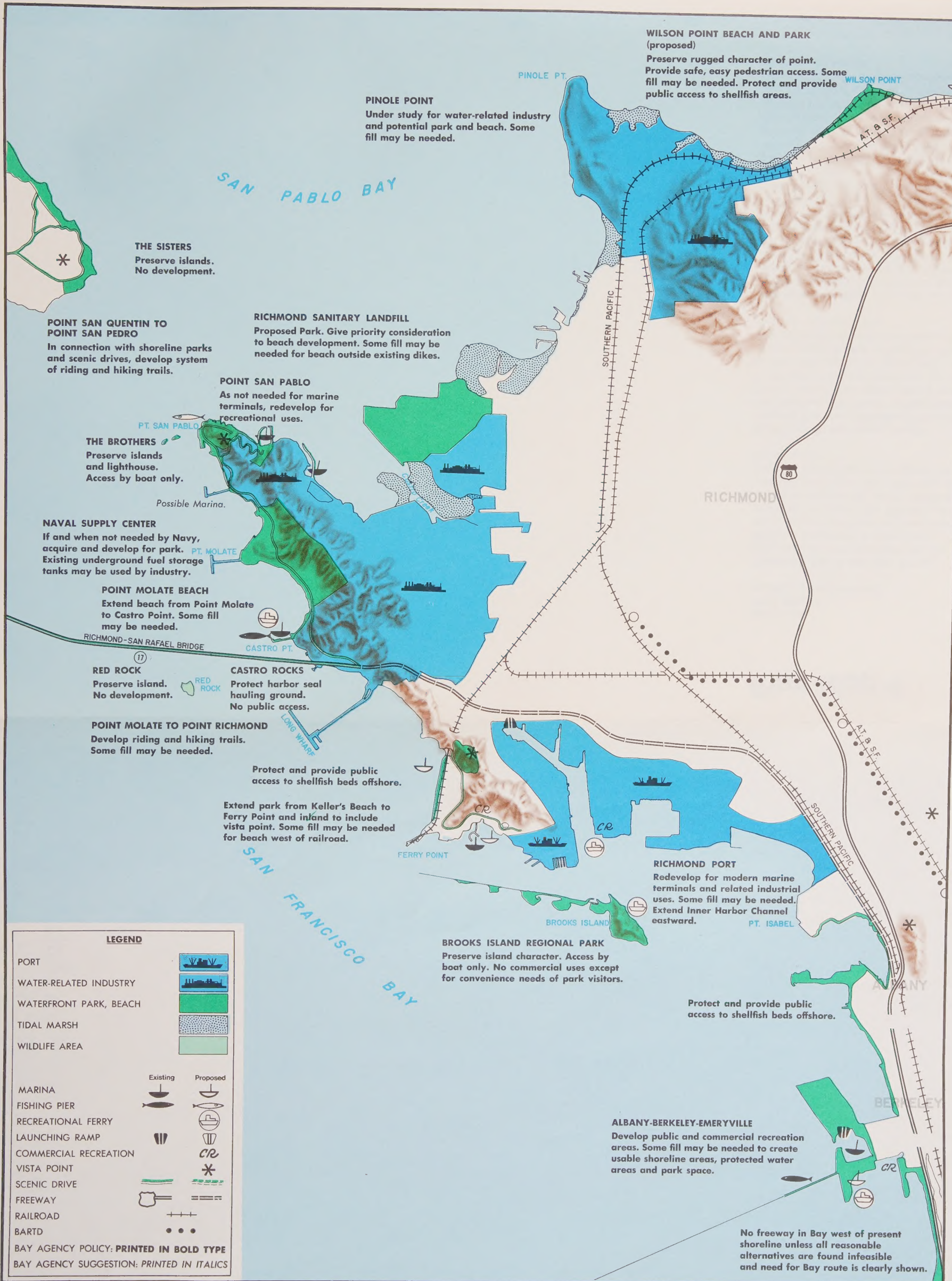
Public access to the Bay for recreation is needed in this area, although existing shoreline conditions make this difficult. All development in this area should include provision for substantial public access.

Naval Supply Center, Point Mo-

late. Plan maps indicate recommended use for Bayfront military installations *if* one or more of these bases is ever declared surplus by the military. The Bay Plan does not advocate the closing of any military installation.

Point Richmond Park. The proposed park will surround some flat land remaining in private use. Use and landscaping of the remaining private lands should be coordinated by owners and city for compatibility with park.

Richmond Port Area. Nearness to deep water offers opportunities for expansion of Richmond port operations. New port development should provide for public access to the Bay, and for waterfront recreation, to the maximum extent feasible. The eastern boundary of the port area should be determined on the basis of a detailed planning study for marine terminals and industrial development. If feasible, this boundary should be far enough west to permit commercial-recreation uses adjacent to Point Isabel.



PINOLE POINT
Under study for water-related industry and potential park and beach. Some fill may be needed.

WILSON POINT BEACH AND PARK (proposed)
Preserve rugged character of point. Provide safe, easy pedestrian access. Some fill may be needed. Protect and provide public access to shellfish areas.

THE SISTERS
Preserve islands. No development.

POINT SAN QUENTIN TO POINT SAN PEDRO
In connection with shoreline parks and scenic drives, develop system of riding and hiking trails.

RICHMOND SANITARY LANDFILL
Proposed Park. Give priority consideration to beach development. Some fill may be needed for beach outside existing dikes.

POINT SAN PABLO
As not needed for marine terminals, redevelop for recreational uses.

THE BROTHERS
Preserve islands and lighthouse. Access by boat only.

NAVAL SUPPLY CENTER
If and when not needed by Navy, acquire and develop for park. Existing underground fuel storage tanks may be used by industry.

POINT MOLATE BEACH
Extend beach from Point Molate to Castro Point. Some fill may be needed.

RED ROCK
Preserve island. No development.

CASTRO ROCKS
Protect harbor seal hauling ground. No public access.

POINT MOLATE TO POINT RICHMOND
Develop riding and hiking trails. Some fill may be needed.

Protect and provide public access to shellfish beds offshore.

Extend park from Keller's Beach to Ferry Point and inland to include vista point. Some fill may be needed for beach west of railroad.

RICHMOND PORT
Redevelop for modern marine terminals and related industrial uses. Some fill may be needed. Extend Inner Harbor Channel eastward.

BROOKS ISLAND REGIONAL PARK
Preserve island character. Access by boat only. No commercial uses except for convenience needs of park visitors.

Protect and provide public access to shellfish beds offshore.

ALBANY-BERKELEY-EMERYVILLE
Develop public and commercial recreation areas. Some fill may be needed to create usable shoreline areas, protected water areas and park space.

No freeway in Bay west of present shoreline unless all reasonable alternatives are found infeasible and need for Bay route is clearly shown.

LEGEND

PORT	
WATER-RELATED INDUSTRY	
WATERFRONT PARK, BEACH	
TIDAL MARSH	
WILDLIFE AREA	
MARINA	
FISHING PIER	
RECREATIONAL FERRY	
LAUNCHING RAMP	
COMMERCIAL RECREATION	
VISTA POINT	
SCENIC DRIVE	
FREEWAY	
RAILROAD	
BARTD	
BAY AGENCY POLICY: PRINTED IN BOLD TYPE	
BAY AGENCY SUGGESTION: PRINTED IN ITALICS	

Plan Map 4

Notes to Plan Map 4 Berkeley to Oakland

Oakland North Harbor Area.

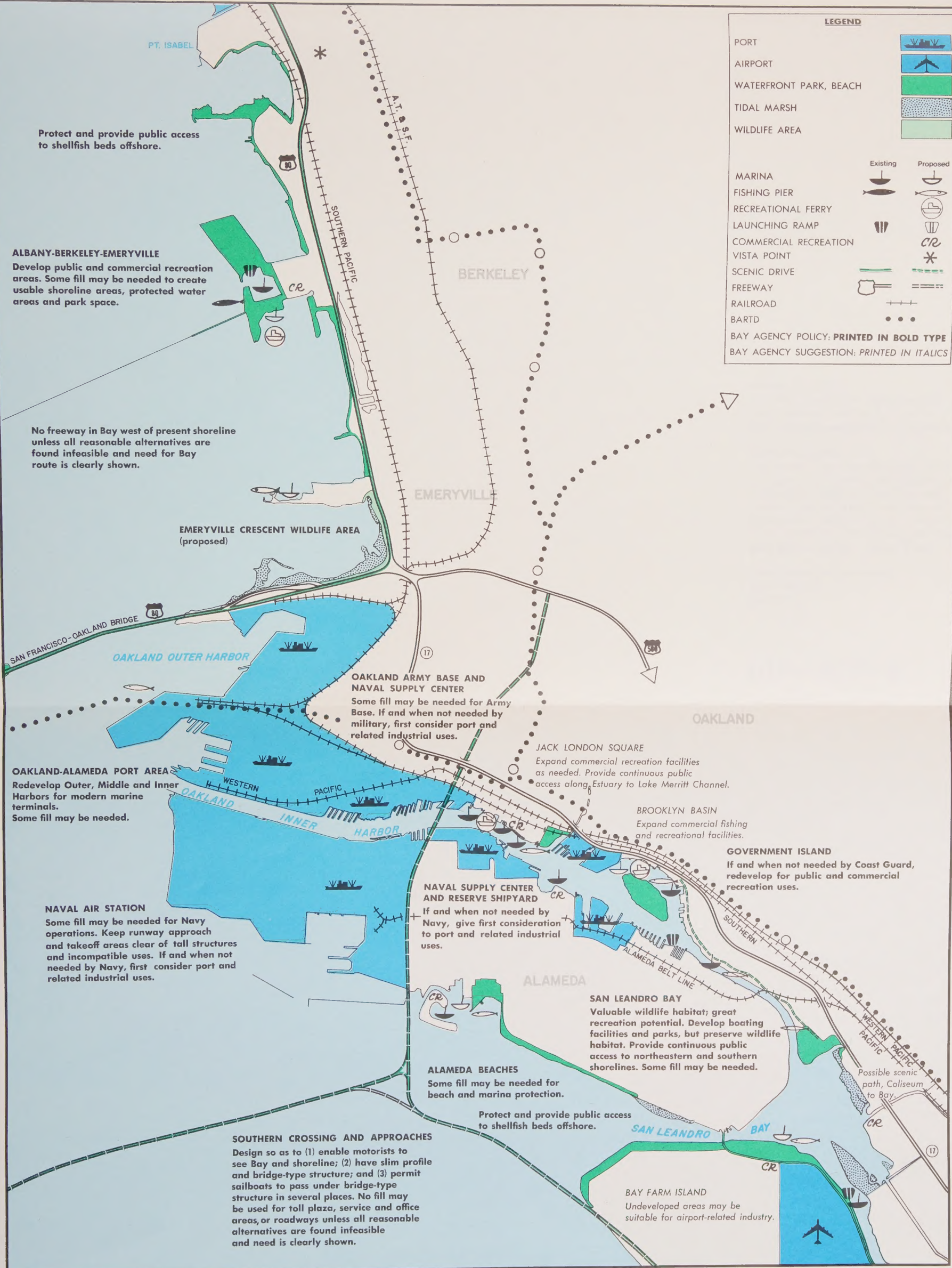
The proposed Oakland North Harbor fill is not included in the Bay Plan because need for it has not been substantiated. However, the Port of Oakland proposal should receive continued consideration in the light of changes in shipping technology and regional port facility needs.

Oakland Army Base, Naval Supply Centers, Alameda Naval Air Station and Reserve Shipyard.

Plan maps indicate recommended use for Bayfront military installations *if* one or more of these bases is ever declared surplus by the military. The Bay Plan does not advocate the closing of any military installation.

San Leandro Bay. Bay Plan includes Alternative A, one of four proposals for San Leandro Bay in report to Port of Oakland by consultants Wilsey and Ham, but without a 66th Avenue roadway crossing the Bay. Alternative A emphasizes maintaining ecology and increasing recreation. Some dredging required for boating.

Bay Farm Island. About 1,000 acres, diked and now being filled, are planned for housing. The site is adjacent to Oakland Airport, and may be suitable for airport-oriented industry. Bay Farm Island development should not interfere with aircraft operations at Oakland Airport.



LEGEND

PORT	
AIRPORT	
WATERFRONT PARK, BEACH	
TIDAL MARSH	
WILDLIFE AREA	
MARINA	
FISHING PIER	
RECREATIONAL FERRY	
LAUNCHING RAMP	
COMMERCIAL RECREATION	
VISTA POINT	
SCENIC DRIVE	
FREEWAY	
RAILROAD	
BARTD	
BAY AGENCY POLICY: PRINTED IN BOLD TYPE	
BAY AGENCY SUGGESTION: PRINTED IN ITALICS	

Protect and provide public access to shellfish beds offshore.

ALBANY-BERKELEY-EMERYVILLE
Develop public and commercial recreation areas. Some fill may be needed to create usable shoreline areas, protected water areas and park space.

No freeway in Bay west of present shoreline unless all reasonable alternatives are found infeasible and need for Bay route is clearly shown.

EMERYVILLE CRESCENT WILDLIFE AREA
(proposed)

OAKLAND ARMY BASE AND NAVAL SUPPLY CENTER
Some fill may be needed for Army Base. If and when not needed by military, first consider port and related industrial uses.

OAKLAND-ALAMEDA PORT AREA
Redevelop Outer, Middle and Inner Harbors for modern marine terminals. Some fill may be needed.

NAVAL AIR STATION
Some fill may be needed for Navy operations. Keep runway approach and takeoff areas clear of tall structures and incompatible uses. If and when not needed by Navy, first consider port and related industrial uses.

JACK LONDON SQUARE
Expand commercial recreation facilities as needed. Provide continuous public access along Estuary to Lake Merritt Channel.

BROOKLYN BASIN
Expand commercial fishing and recreational facilities.

GOVERNMENT ISLAND
If and when not needed by Coast Guard, redevelop for public and commercial recreation uses.

NAVAL SUPPLY CENTER AND RESERVE SHIPYARD
If and when not needed by Navy, give first consideration to port and related industrial uses.

SAN LEANDRO BAY
Valuable wildlife habitat; great recreation potential. Develop boating facilities and parks, but preserve wildlife habitat. Provide continuous public access to northeastern and southern shorelines. Some fill may be needed.

ALAMEDA BEACHES
Some fill may be needed for beach and marina protection.

Protect and provide public access to shellfish beds offshore.

SOUTHERN CROSSING AND APPROACHES
Design so as to (1) enable motorists to see Bay and shoreline; (2) have slim profile and bridge-type structure; and (3) permit sailboats to pass under bridge-type structure in several places. No fill may be used for toll plaza, service and office areas, or roadways unless all reasonable alternatives are found infeasible and need is clearly shown.

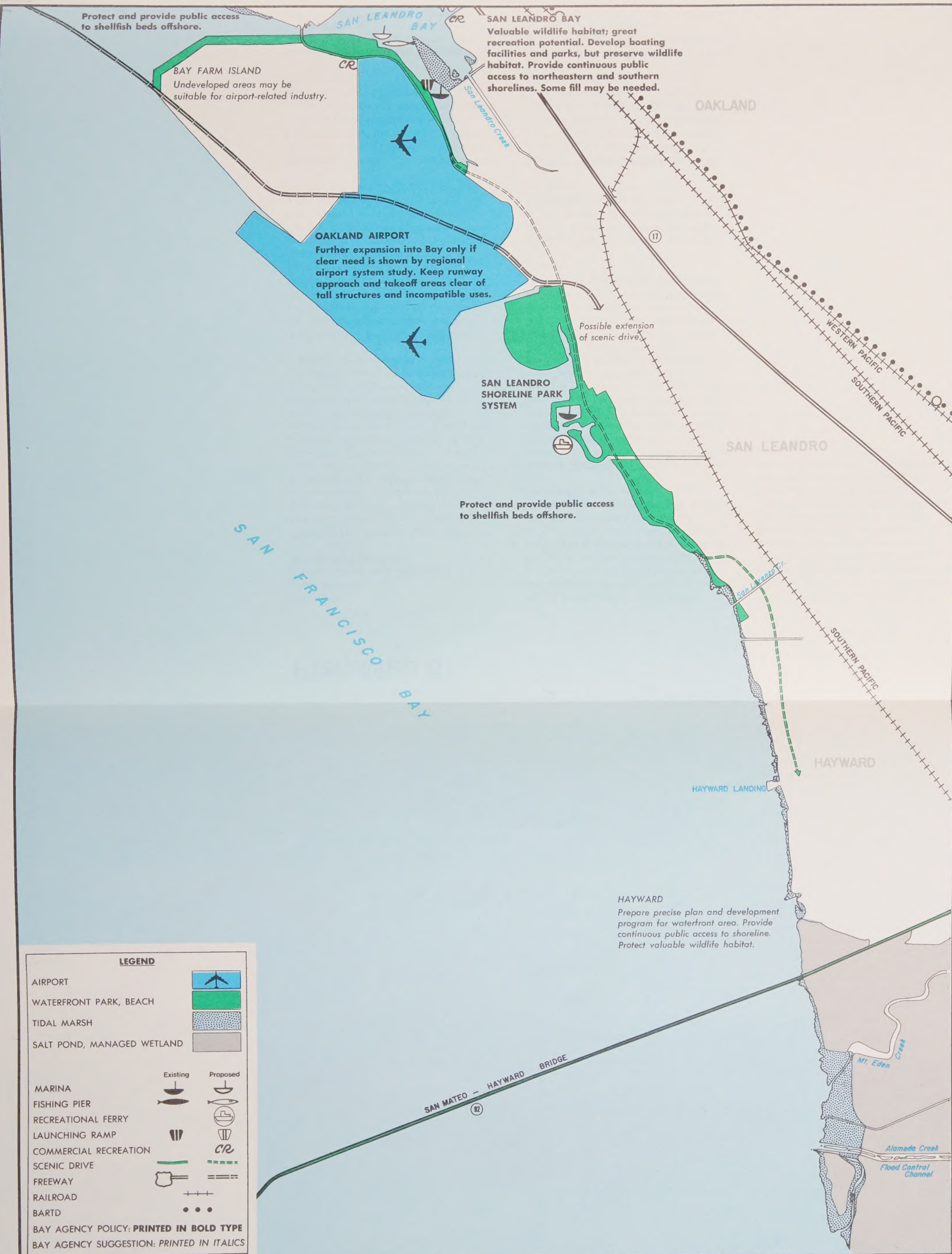
BAY FARM ISLAND
Undeveloped areas may be suitable for airport-related industry.

Plan Map 5

Notes to Plan Map 5 San Leandro, Hayward

Bay Farm Island. About 1,000 acres, diked and now being filled, are planned for housing. The site is adjacent to Oakland Airport and may be suitable for airport-oriented industry. Bay Farm Island development should not interfere with aircraft operations at Oakland Airport.

Hayward Waterfront. Presently undeveloped. Detailed planning is needed to determine most desirable waterfront design.



Protect and provide public access to shellfish beds offshore.

BAY FARM ISLAND
Undeveloped areas may be suitable for airport-related industry.

OAKLAND AIRPORT
Further expansion into Bay only if clear need is shown by regional airport system study. Keep runway approach and takeoff areas clear of tall structures and incompatible uses.

SAN LEANDRO BAY
Valuable wildlife habitat; great recreation potential. Develop boating facilities and parks, but preserve wildlife habitat. Provide continuous public access to northeastern and southern shorelines. Some fill may be needed.

SAN LEANDRO SHORELINE PARK SYSTEM

Protect and provide public access to shellfish beds offshore.

Possible extension of scenic drive.

SAN LEANDRO

HAYWARD LANDING

HAYWARD
Prepare precise plan and development program for waterfront area. Provide continuous public access to shoreline. Protect valuable wildlife habitat.

SAN MATEO — HAYWARD BRIDGE

LEGEND

- | | |
|--|--|
| AIRPORT | |
| WATERFRONT PARK, BEACH | |
| TIDAL MARSH | |
| SALT POND, MANAGED WETLAND | |
| MARINA | |
| FISHING PIER | |
| RECREATIONAL FERRY | |
| LAUNCHING RAMP | |
| COMMERCIAL RECREATION | |
| SCENIC DRIVE | |
| FREEWAY | |
| RAILROAD | |
| BARTD | |
| BAY AGENCY POLICY: PRINTED IN BOLD TYPE | |
| BAY AGENCY SUGGESTION: <i>PRINTED IN ITALICS</i> | |

Plan Map 6

Notes to Plan Map 6 Santa Clara and Southern Alameda Counties

Dumbarton Bridge Approach. If salt ponds north and south of bridge approach are ever removed from salt production, dikes could be breached and ponds opened to tidal action; water circulation might thus be improved. (This would involve public purchase or required opening of dike as part of plan to urbanize other pond areas.) This possibility should be considered in the design of new Dumbarton Bridge and Freeway; present causeway on earth fill might be replaced by structure on pilings.

Toll Plaza. Best site for toll plaza for new Dumbarton Bridge is difficult to determine: toll plaza on east shore should avoid cutting into Coyote Hills, should avoid filling of Bay or salt ponds, and should be satisfactory distance from interchange with proposed Freeway Route 61. Similar location problems exist on west shore. Further study required, including consideration of collecting tolls in manner not necessitating toll plaza.

Plummer Creek. Plummer Creek to the eastern limit of the salt pond area is a vital part of the ecological system of the Bay and is included within the proposed jurisdiction of the Bay agency (for purposes of filling and dredging control only).

**Access to Parks and Marinas
Outside Salt Ponds.** Some parks and marinas are proposed Bayward of salt ponds. Access to these facilities

would require cooperation of the salt company. Parking would not be provided near the facilities because this would require substantial fill and because salt pond dikes would not accommodate heavy vehicles. Access might be provided by lightweight shuttle vehicles atop dikes, with parking confined to areas ashore.

Water Quality. Water at extreme south end of Bay is often polluted so as to discourage recreational use of sloughs and Bay. Greater recreational use will require improved water quality. Some improvements in the quality of water in the South Bay are now being made pursuant to requirements of the Regional Water Quality Control Board, and studies underway by waste dischargers will lead to further improvements. Recommendations for long-range improvements to water quality will be part of the 1969 plan of the Bay-Delta Water Quality Control Program.

Subsidence. Area subject to subsidence. Construction in or near Bay should be carefully planned, taking into account effects of future subsidence.

Moffett Naval Air Station. Plan maps indicate recommended use for Bayfront military installations if one or more of these bases is ever declared surplus by the military. The Bay Plan does not advocate the closing of any military installation.

National Wildlife Refuge. Two areas on Map 6 are being considered by the U. S. Department of the Interior for acquisition as a Federal

Wildlife Refuge. The inclusion of either or both areas—the salt ponds and marshes in Alameda County south of Coyote Hills Slough, and those between Coyote Creek and Alviso Slough in Santa Clara County—would be consistent with Bay Plan policies. The terms of the acquisition should permit the salt ponds to continue in operation as long as desired by the owner of the ponds.

Plan Map 7

Notes to Plan Map 7 Coyote Creek

Coyote Creek. Coyote Creek to the easternmost point of Newby Island, and also the branch of the creek on the south side of the island, are vital parts of the ecological system of the Bay and are included within the proposed jurisdiction of the Bay agency (for purposes of filling and dredging control only).

National Wildlife Refuge. The salt ponds and marshes between Coyote Creek and Alviso Slough are being considered by the U. S. Department of the Interior for acquisition as a Federal Wildlife Refuge. This proposal would be consistent with Bay Plan policies. The terms of the acquisition should permit the salt ponds to continue in operation as long as desired by the owner of the ponds.

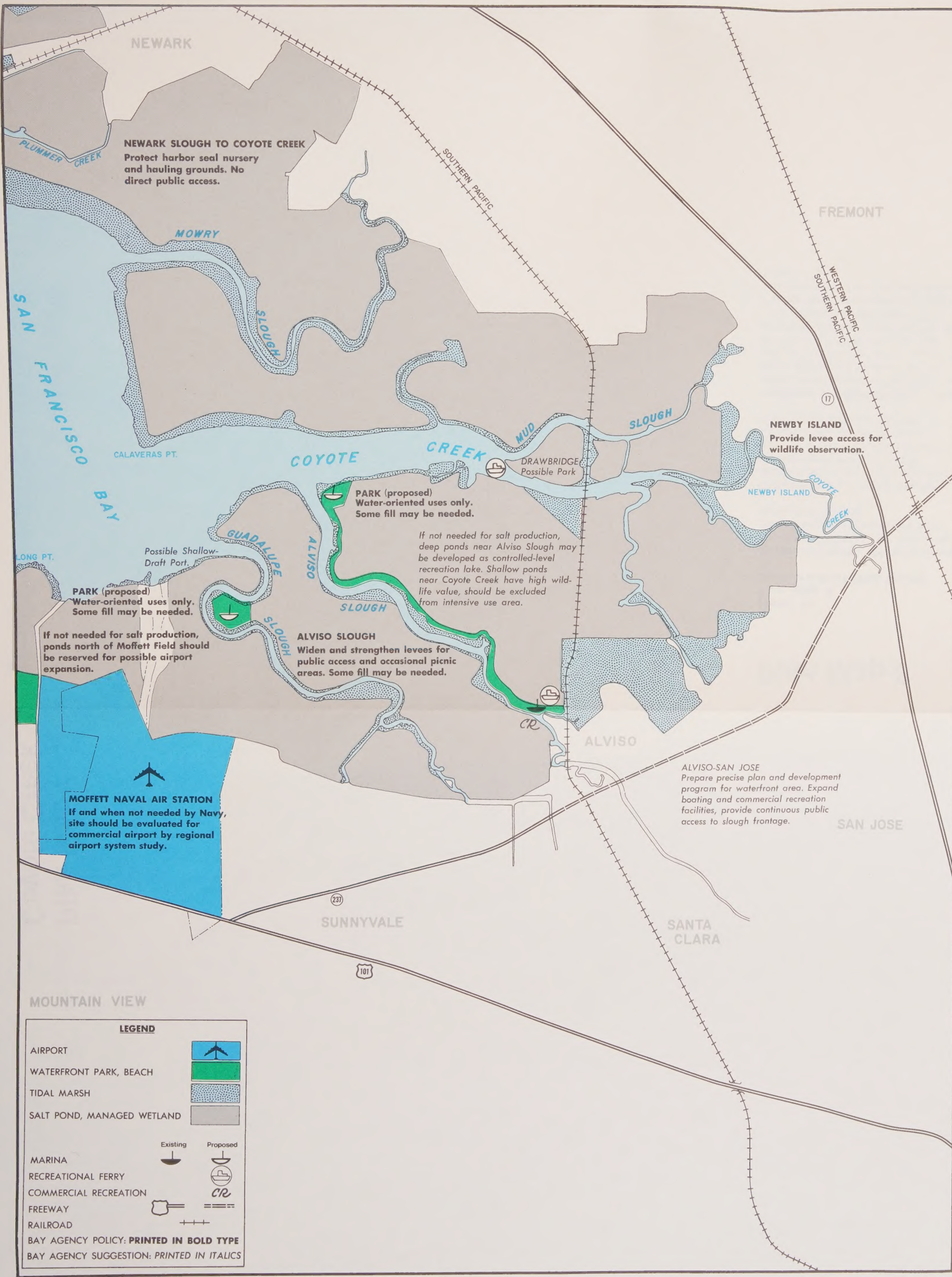
Alviso-San Jose Waterfront. Detailed planning is needed to determine most desirable waterfront design and to overcome subsidence problems. Proposals should emphasize the great recreation potential of this area.

Access to Parks and Marinas Outside Salt Ponds. Some parks and marinas are proposed Bayward of salt ponds. Access to these facilities would require cooperation of the salt company. Parking would not be provided near the facilities because this would require substantial fill and because salt pond dikes would not accommodate heavy vehicles.

Access might be provided by light-weight shuttle vehicles atop dikes, with parking confined to areas ashore.

Water Quality. Water at extreme south end of Bay is often polluted so as to discourage recreational use of sloughs and Bay. Greater recreational use will require improved water quality. Some improvements in the quality of water in the South Bay are now being made pursuant to requirements of the Regional Water Quality Control Board, and studies underway by waste dischargers will lead to further improvements. Recommendations for long-range improvement to water quality will be part of the 1969 plan of the Bay-Delta Water Quality Control Program.

Moffett Naval Air Station. Plan maps indicate recommended use for Bayfront military installations *if* one or more of these bases is ever declared surplus by the military. The Bay Plan does not advocate the closing of any military installation.



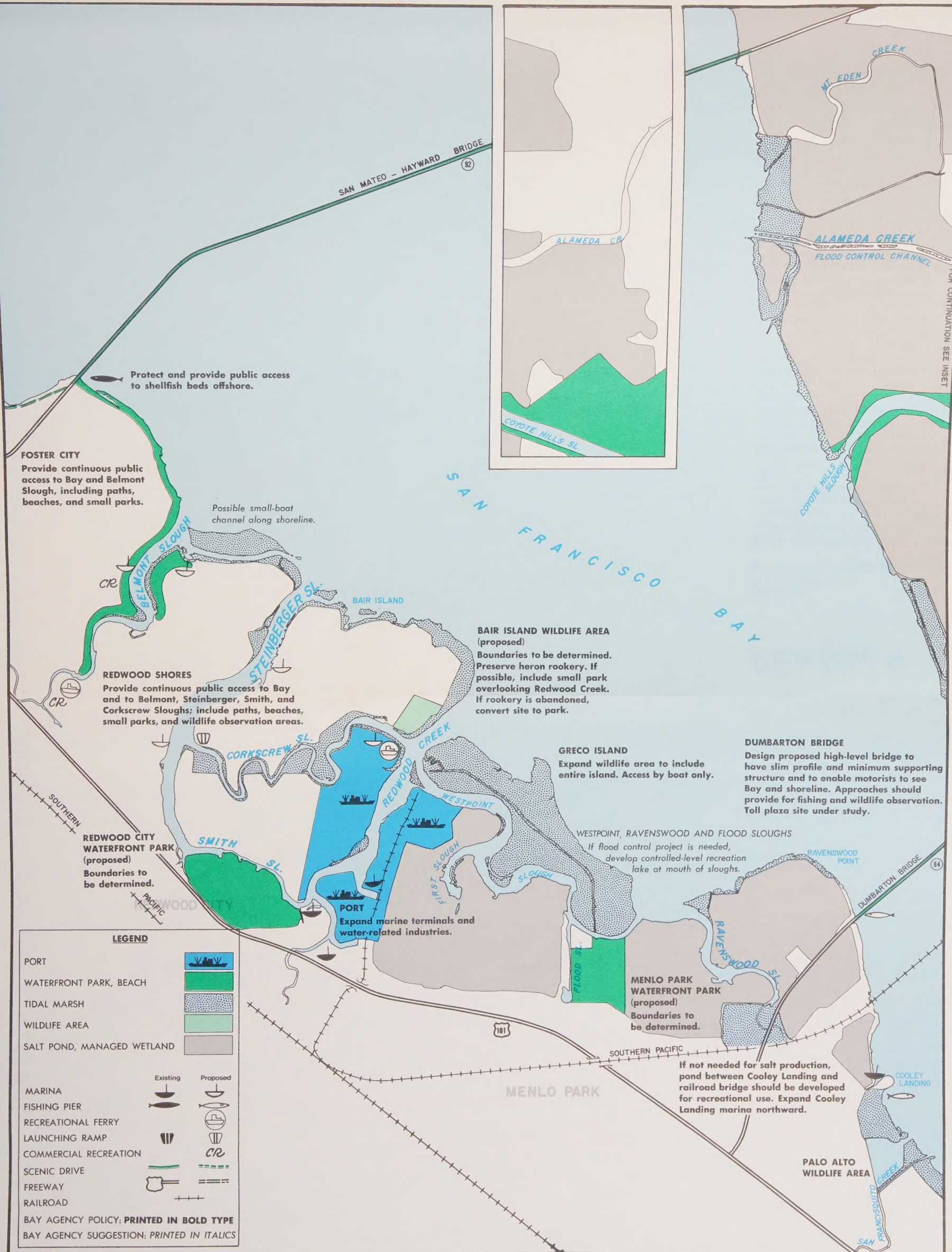
Plan Map 8

Notes to Plan Map 8 Southern San Mateo County

Redwood Creek. Redwood Creek, Bayward of Smith Slough, is an integral part of the slough system and therefore part of the Bay.

Greco Island. Largest remaining marsh in South Bay. Marsh and adjacent mudflats are important feeding area for birds. Area used by California Clapper Rail, rare species of bird endangered by loss of habitat.

National Wildlife Refuge. Greco Island and a portion of Bair Island are being considered by the U. S. Department of the Interior for acquisition as a Federal Wildlife Refuge. This proposal would be consistent with Bay Plan policies provided that it did not interfere with commercial shipping and recreational boating in Redwood Creek.



Plan Map 9

Notes to Plan Map 9 Northern San Mateo County

Burlingame Waterfront. Presently undeveloped. Detailed planning needed to determine most desirable waterfront design emphasizing recreation with minimum of Bay filling.

San Mateo (City) Waterfront. Presently undeveloped. Detailed planning needed to determine most desirable waterfront design emphasizing recreation with minimum of Bay filling.

Possible Shoreline Channel. Dredging shallow-draft channel parallel to shore would greatly increase recreational opportunities for small boats and recreational ferries. This could be done so as to separate valuable marshes and mudflats from the shoreline, without damage to ecology. Dredged mud could be carefully placed to create new marsh, but dredging might be costly.



Plan Map 10

Notes to Plan Map 10 San Francisco and Brisbane

San Francisco-Marin Crossing.

The Central Bay is the most widely enjoyed part of the entire Bay and this attractive setting should be protected. Transportation agencies have reached general agreement that traffic congestion problems can best be solved by establishing fast, modern complete bus system. Therefore, Plan makes no provision for second deck on Golden Gate Bridge, or for any additional vehicular crossing. Increased auto capacity on Golden Gate Bridge, or a new vehicular crossing, could require new or enlarged toll plazas, service areas, access ramps, and freeways on both the San Francisco and Marin sides, with possible disruption of scenic areas on both sides of the Bay.

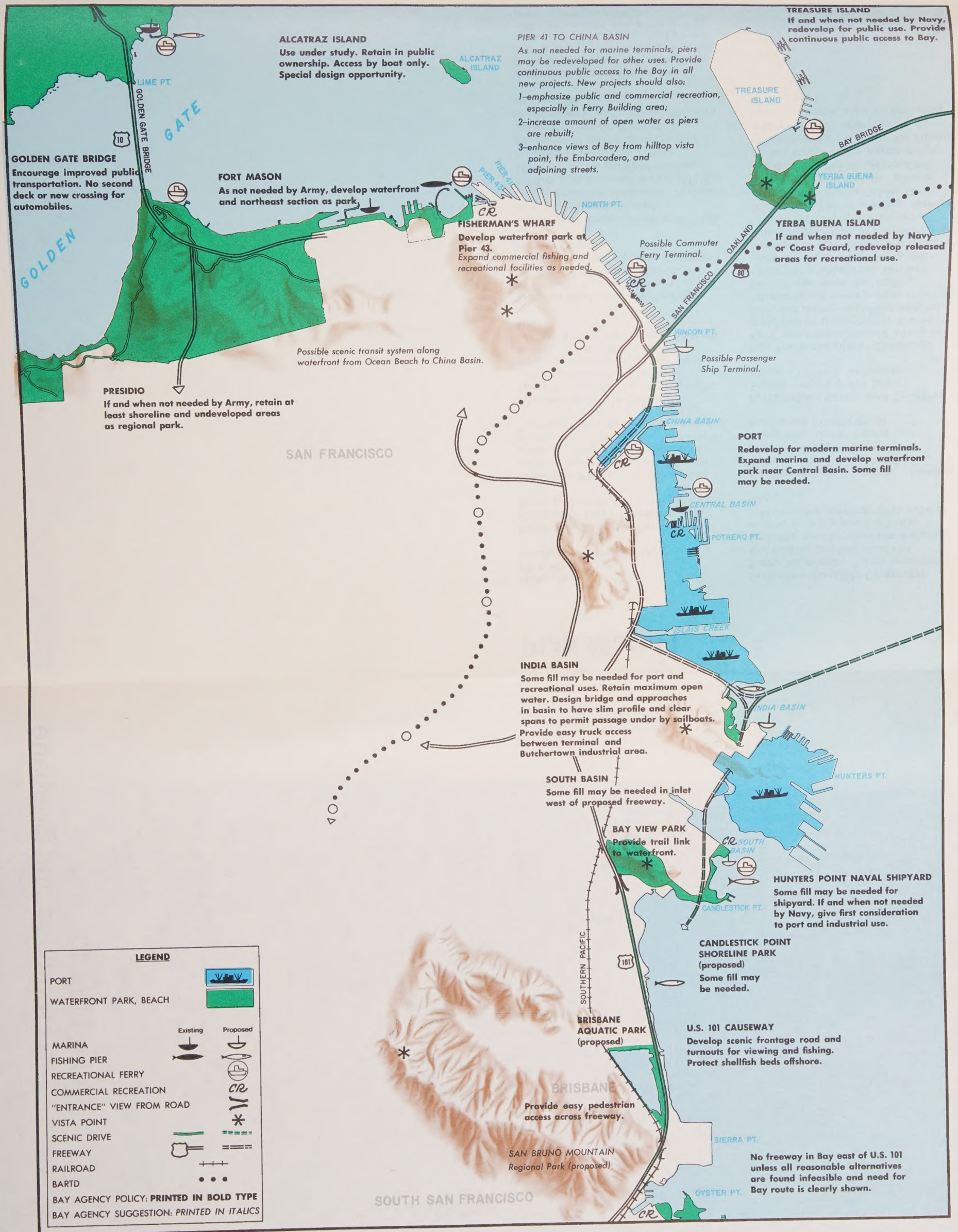
San Francisco Waterfront. Suggested scenic transit system (special bus, elephant train, cog railway, etc.) could be major waterfront attraction, could eventually operate entire distance from Golden Gate Bridge (or even Ocean Beach) to Ferry Building (or south to China Basin).

Hunters Point Naval Shipyard.

Plan maps indicate recommended use for Bayfront military installations *if* one or more of these bases is ever declared surplus by the military. The Plan does not advocate the closing of any military installation.

**Hunters Point Freeway at
Candlestick Point.** Connection to
U. S. 101 south of Candlestick Point

requires further study. If connection is close to Candlestick Cove, large overpass structure will be required, marring present spectacular views of Bay for motorists heading south on Bayshore Freeway at Bayview Hill. If connection is farther south, in Brisbane, long structure in Bay will be required. Other considerations include effects upon future development on shoreline of Candlestick Cove, and future U. S. 101 connections to proposed Geneva Avenue and Guadalupe Parkway extensions.



Plan Map 11

Notes to Plan Map 11 Southern Marin County

Point San Quentin—Possible Commuter Ferry Terminal. No fill for parking beyond existing dikes.

Shoreline Parks. Shoreline parks could be built in several areas between existing or proposed shoreline roads and the shore from Tiburon Peninsula to Point San Pedro. Further study needed.

Tiburon—Possible Commuter Ferry Terminal. To minimize traffic and parking problem, should be served by mass transit, or else designed to serve southern Marin only with another terminal built to serve northern Marin.

Tiburon Boulevard Widening. Minimize fill by using existing roadbed (or perhaps railroad right-of-way) as part of new right-of-way. Preserve hilltop vista point.

Richardson Bay. Under study. Problems: (1) substantial dredging required because of siltation, (2) access needed to upper reaches west of U. S. 101 Freeway for potential marinas, (3) complex ownership pattern. Objectives of current study: to provide suitable private development, a shoreline park, and a scenic drive with minimum Bay filling.

Sausalito Recreational Ferry. Ferry terminal could be connected to central area by "elephant train" along waterfront or Bridgeway. Or terminal could be placed in central area if parking can be provided.

Sausalito—Possible Commuter Ferry Terminal. To minimize traffic and parking problem, should be served by mass transit or else designed to serve Sausalito and Mill Valley only with other terminals serving rest of Marin.

Appearance and Design. Housing density in hills of Sausalito, Tiburon, and Belvedere should respect the topography; cluster development appropriate in some areas.

Forts Baker, Barry, and Cronkite. Surplus Army land now being acquired for State Park system.

San Francisco-Marin Crossing. The Central Bay is the most widely enjoyed part of the entire Bay and this attractive setting should be protected. Transportation agencies have reached general agreement that traffic congestion problems can best be solved by establishing fast, modern complete bus system. Therefore, Plan makes no provision for second deck on Golden Gate Bridge, or for any additional vehicular crossing. Increased auto capacity on the Golden Gate Bridge, or a new vehicular crossing, could require new or enlarged toll plazas, service areas, access ramps, and freeways on both the San Francisco and Marin sides, with possible disruption of scenic areas on both sides of the Bay.



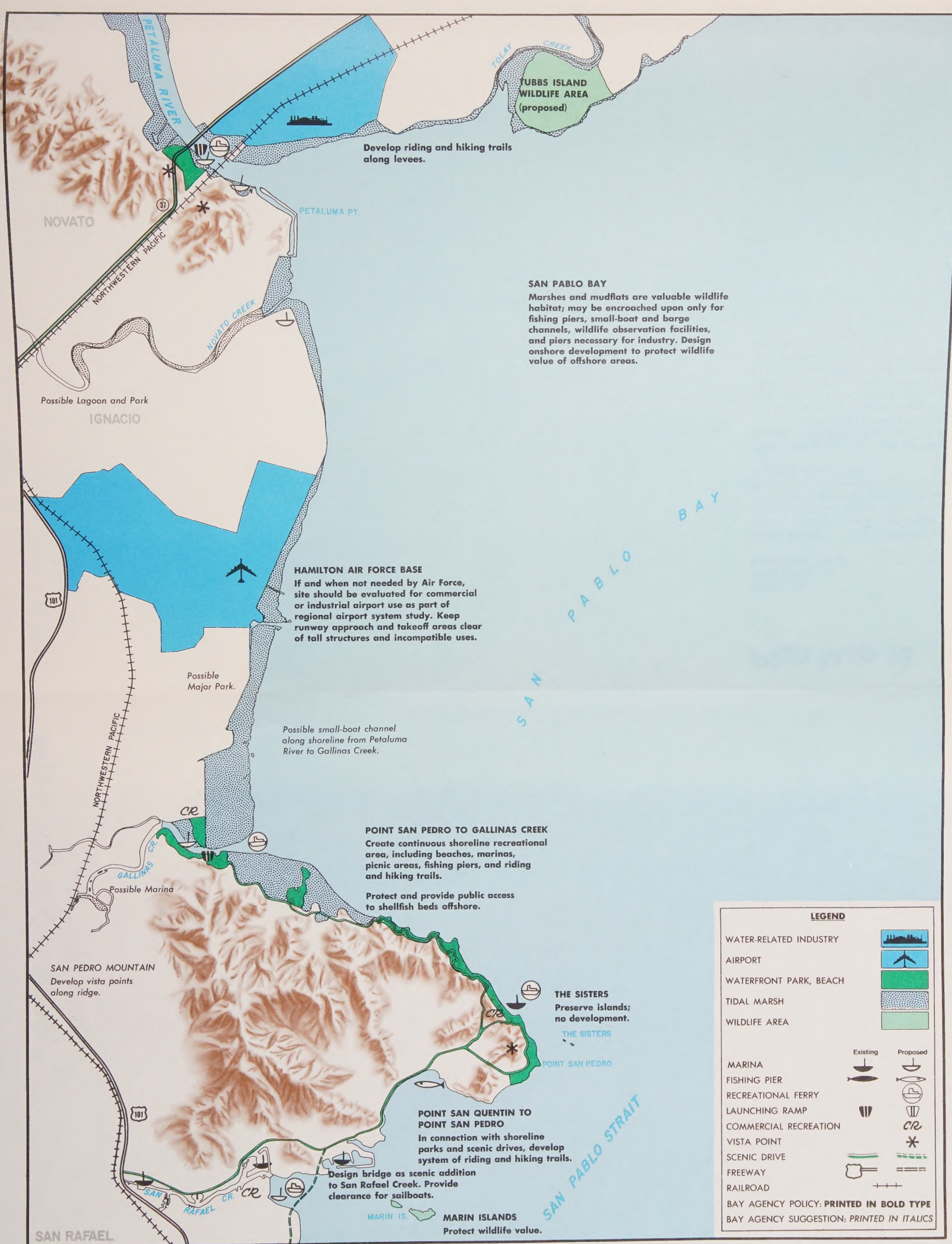
Plan Map 12

Notes to Plan Map 12 Western San Pablo Bay

Hamilton Air Force Base. Plan maps indicate recommended use for Bayfront military installations *if* one or more of these bases is ever declared surplus by the military. The Bay Plan does not advocate the closing of any military installation.

Park Proposal for Area South of Hamilton AFB. Large, undeveloped area between Hamilton AFB and Gallinas Creek is possible site for major county park. Due to extensive offshore mudflats, would not be suitable for water-oriented recreation.

Possible Shoreline Channel. Dredging shallow-draft channel parallel to shore would greatly increase recreational opportunities for small boats and recreational ferries. This could be done so as to separate valuable marshes and mudflats from shoreline without damage to ecology. Dredged mud could be carefully placed to create new marsh, but dredging might be costly.



Develop riding and hiking trails along levees.

SAN PABLO BAY

Marshes and mudflats are valuable wildlife habitat; may be encroached upon only for fishing piers, small-boat and barge channels, wildlife observation facilities, and piers necessary for industry. Design onshore development to protect wildlife value of offshore areas.

HAMILTON AIR FORCE BASE

If and when not needed by Air Force, site should be evaluated for commercial or industrial airport use as part of regional airport system study. Keep runway approach and takeoff areas clear of tall structures and incompatible uses.

POINT SAN PEDRO TO GALLINAS CREEK

Create continuous shoreline recreational area, including beaches, marinas, picnic areas, fishing piers, and riding and hiking trails.

Protect and provide public access to shellfish beds offshore.

THE SISTERS

Preserve islands; no development.

POINT SAN QUENTIN TO POINT SAN PEDRO

In connection with shoreline parks and scenic drives, develop system of riding and hiking trails.

Design bridge as scenic addition to San Rafael Creek. Provide clearance for sailboats.

MARIN ISLANDS

Protect wildlife value.

LEGEND

WATER-RELATED INDUSTRY



AIRPORT



WATERFRONT PARK, BEACH



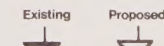
TIDAL MARSH



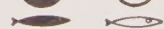
WILDLIFE AREA



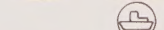
MARINA



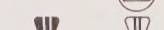
FISHING PIER



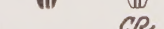
RECREATIONAL FERRY



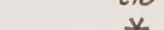
LAUNCHING RAMP



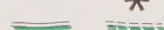
COMMERCIAL RECREATION



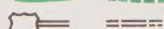
VISTA POINT



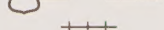
SCENIC DRIVE



FREEWAY



RAILROAD



BAY AGENCY POLICY: PRINTED IN BOLD TYPE

BAY AGENCY SUGGESTION: PRINTED IN ITALICS

0 2000 4000 6000 8000 10000 FEET

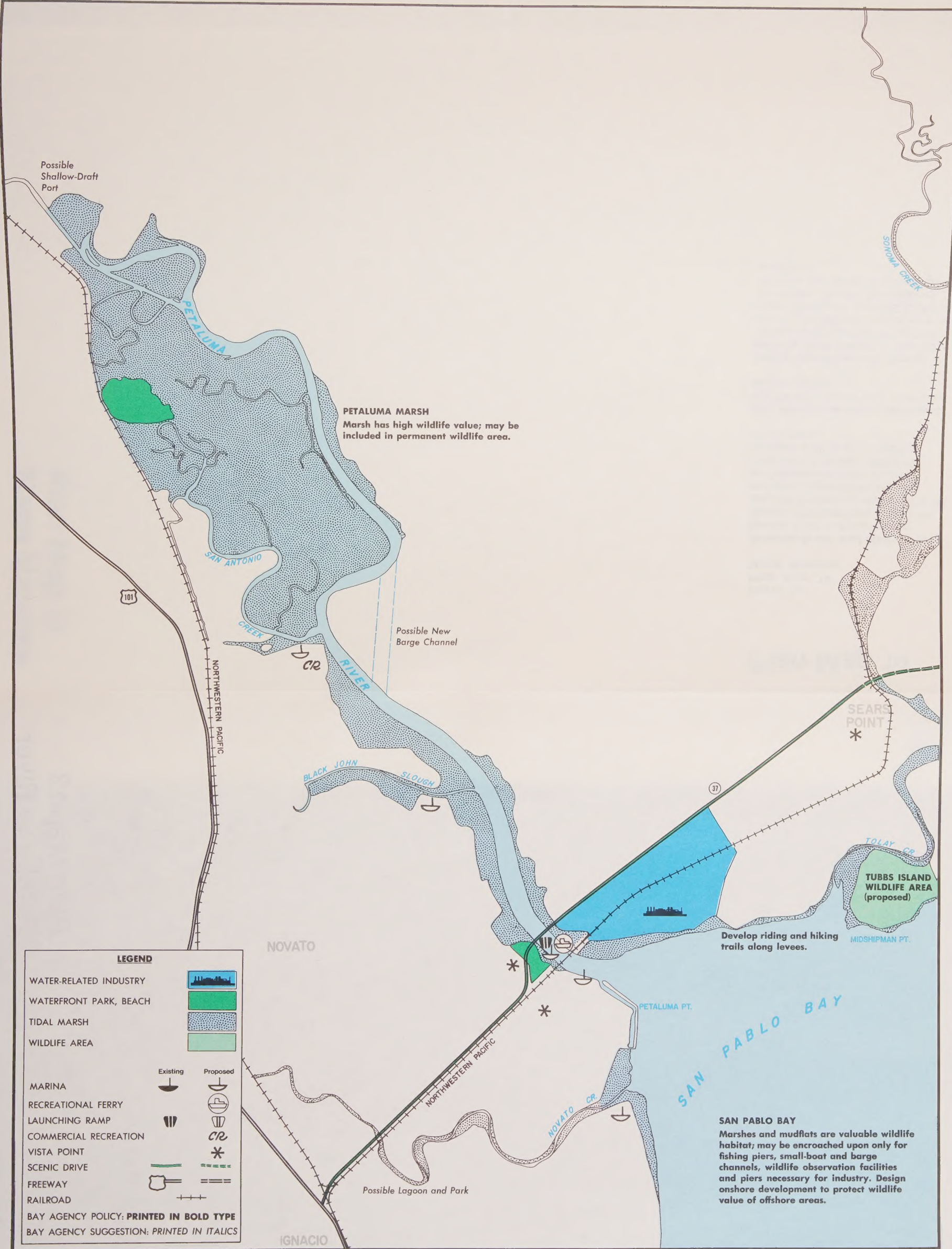
SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

Plan Map 13

Notes to Plan Map 13 Petaluma River

Tolay Creek. Tolay Creek to Sears Point is a vital part of the ecological system of the Bay and is included within the proposed jurisdiction of the Bay agency (for purposes of filling and dredging control only).

Petaluma River and San Antonio Creek. Petaluma River to the north side of the Petaluma marsh, and San Antonio Creek within marsh area, are vital parts of the ecological system of the Bay and are included within the proposed jurisdiction of the Bay agency (for purposes of filling and dredging control only).



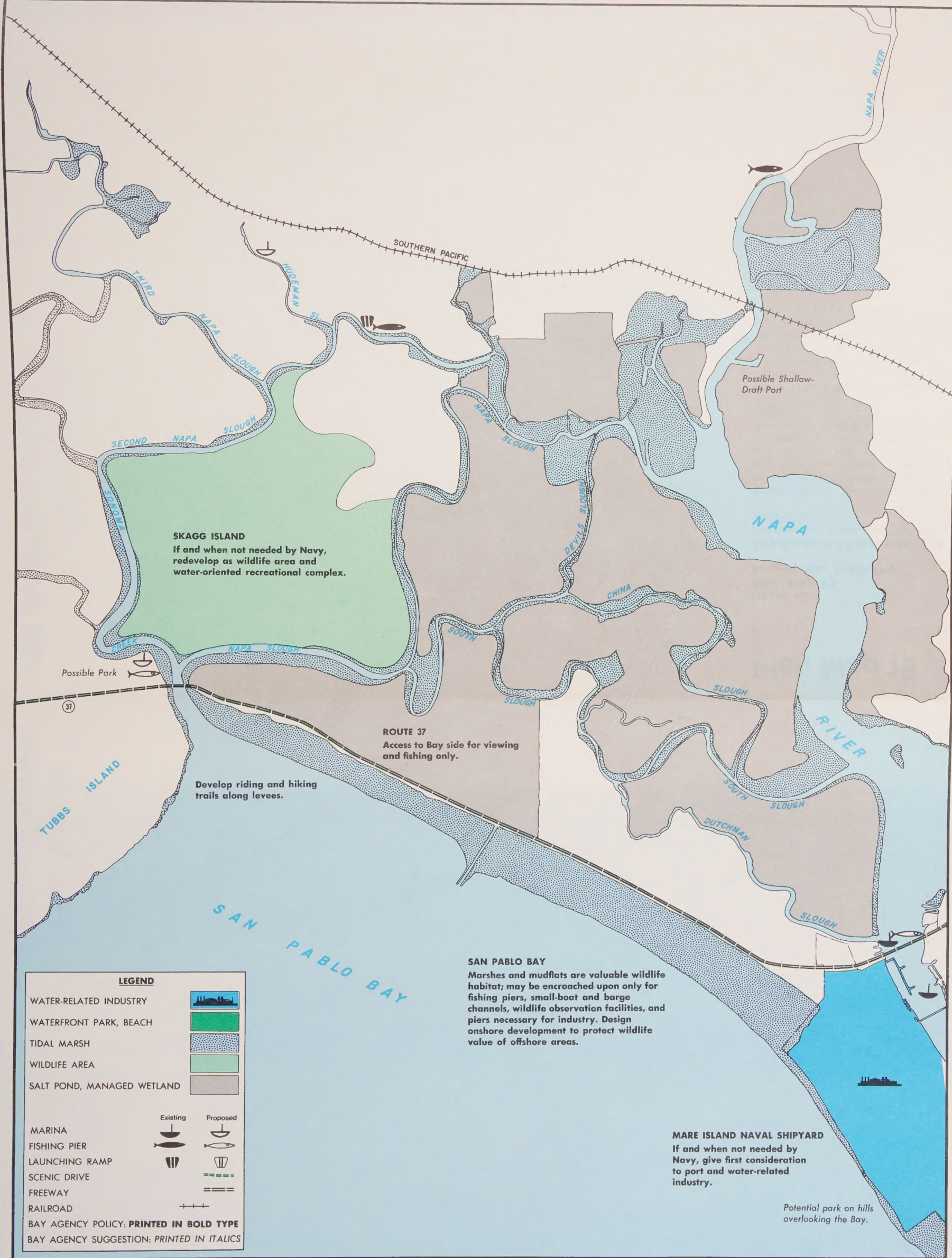
Plan Map 14

Notes to Plan Map 14 Napa Marshes

Sonoma Creek and Napa River. Sonoma Creek to Second Napa Slough, and Napa River to the north side of Bull Island are vital parts of the ecological system of the Bay and are included within the proposed jurisdiction of the Bay agency (for purposes of filling and dredging control only).

Salt Ponds and Other Managed Wetlands. Large area, high-value wildlife habitat.

Skagg Island Security Group Activity (U. S. Navy). Plan maps indicate recommended use for Bayfront military installations *if* one or more of these bases is ever declared surplus by the military. The Bay Plan does not advocate the closing of any military installation.



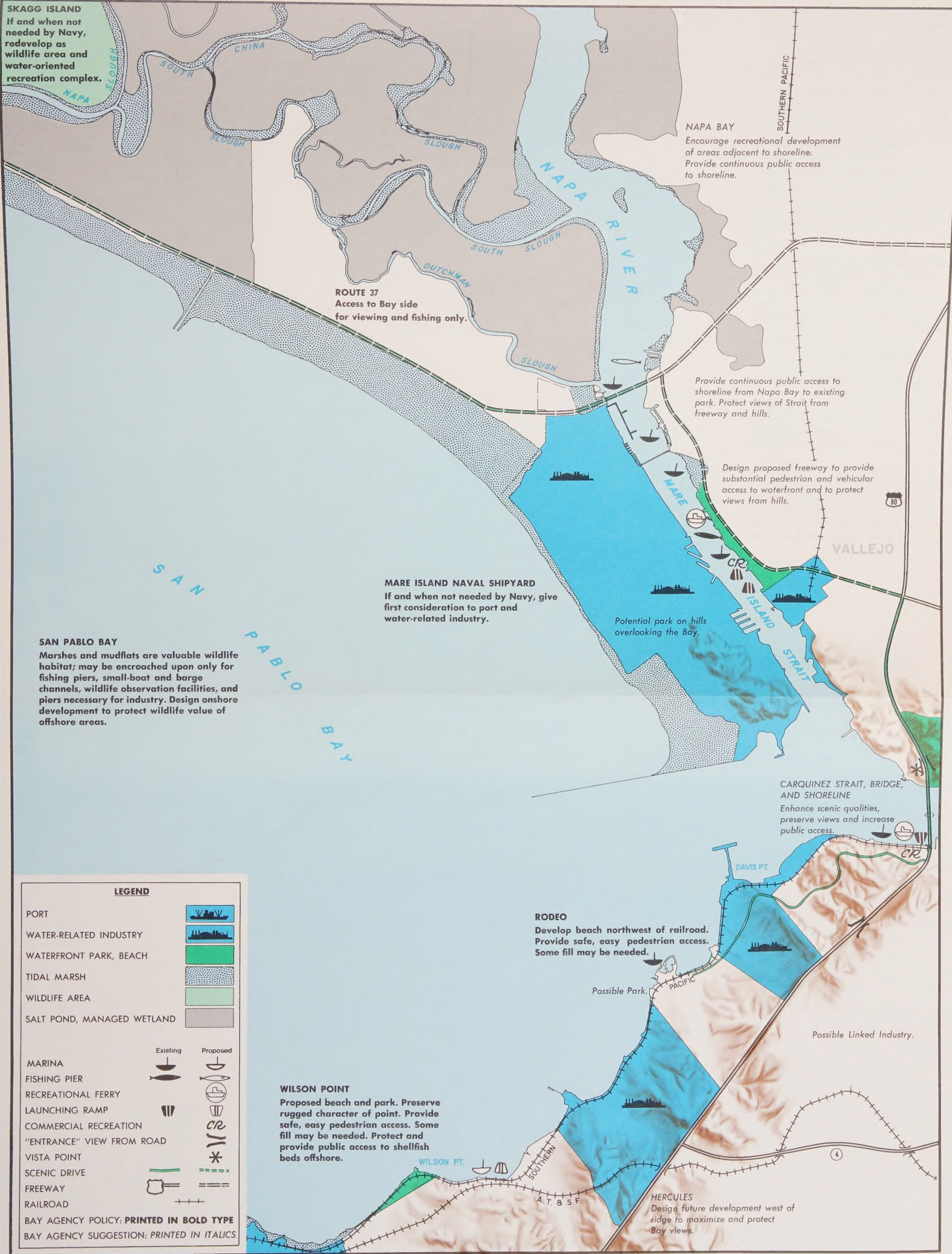
Plan Map 15

Notes to Plan Map 15 Eastern San Pablo Bay

Salt Ponds and Other Managed Wetlands. Large area, high-value wildlife habitat.

Napa River. Napa River to the north side of Bull Island is a vital part of the ecological system of the Bay and is included within the proposed jurisdiction of the Bay agency (for purposes of filling and dredging control only).

Mare Island Naval Shipyard. Plan maps indicate recommended use for Bayfront military installations *if* one or more of these bases is ever declared surplus by the military. The Bay Plan does not advocate the closing of any military installation.



Plan Map 16

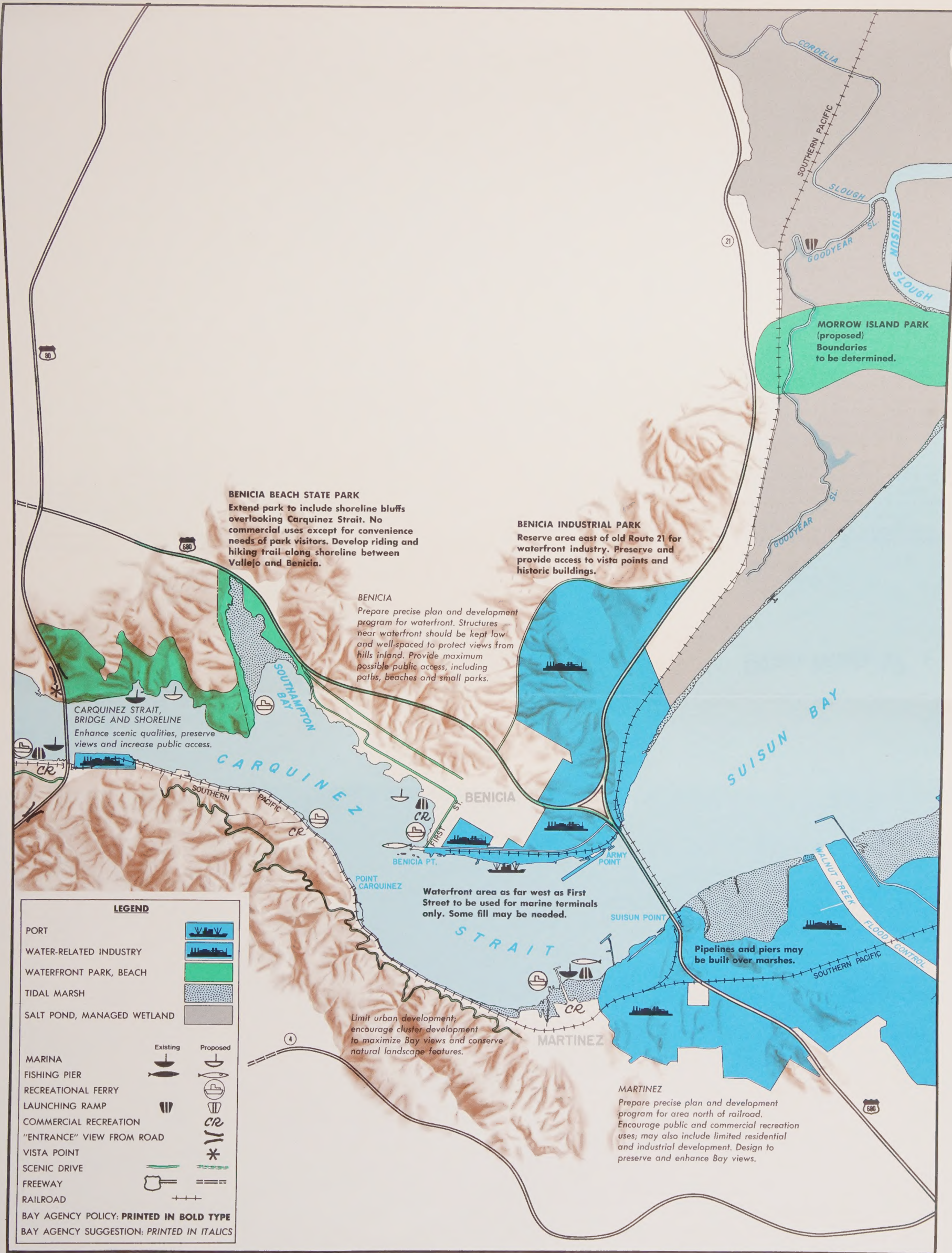
Notes to Plan Map 16 Carquinez Strait

Benicia Beach State Park. Proposed park expansion should encompass principal overlooks and ridges on north side of strait, to preserve rugged and scenic character of hills, presently undeveloped.

Scenic Area South Side of Carquinez Strait. The scenic area includes principal overlook ridges and scenic road between Crockett and Martinez. To preserve presently undeveloped rugged and scenic hills, zoning should provide for extremely sparse development with control over tree removal and location of all structures; scenic easements should be acquired by East Bay Regional Park District, county, or other public body as necessary to guarantee permanent protection. Some park development may be appropriate in valleys leading to Bay.

Benicia Waterfront. Detailed planning is needed to determine most desirable waterfront design, emphasizing "urban" recreation uses with a minimum of Bay filling (and housing on existing private land). Special care needed to insure compatibility between recreational uses and proposed port facility.

Martinez Waterfront. Largely undeveloped at present. Detailed planning is needed to determine most desirable waterfront design. Recreational uses should be emphasized, but a wide variety of activities could be accommodated with a minimum of Bay fill.



Plan Map 17

Notes to Plan Map 17 Suisun Bay

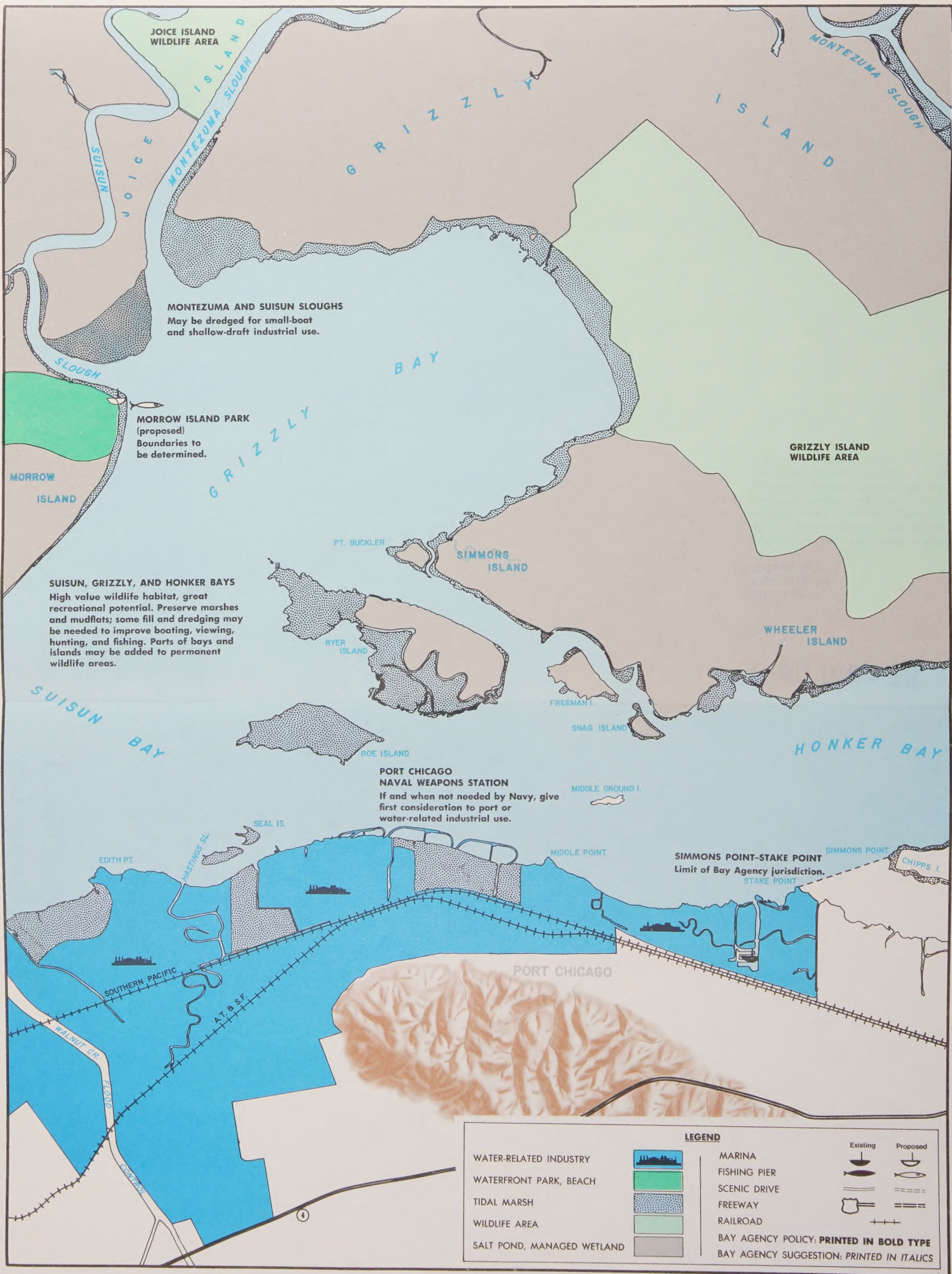
Suisun Marsh. Thousands of acres of controlled marshes are maintained by duck-hunting clubs as wildfowl habitat. Areas are diked, but dikes are opened for periodic flooding. Suisun Soil Conservation District protects and enhances marshland areas.

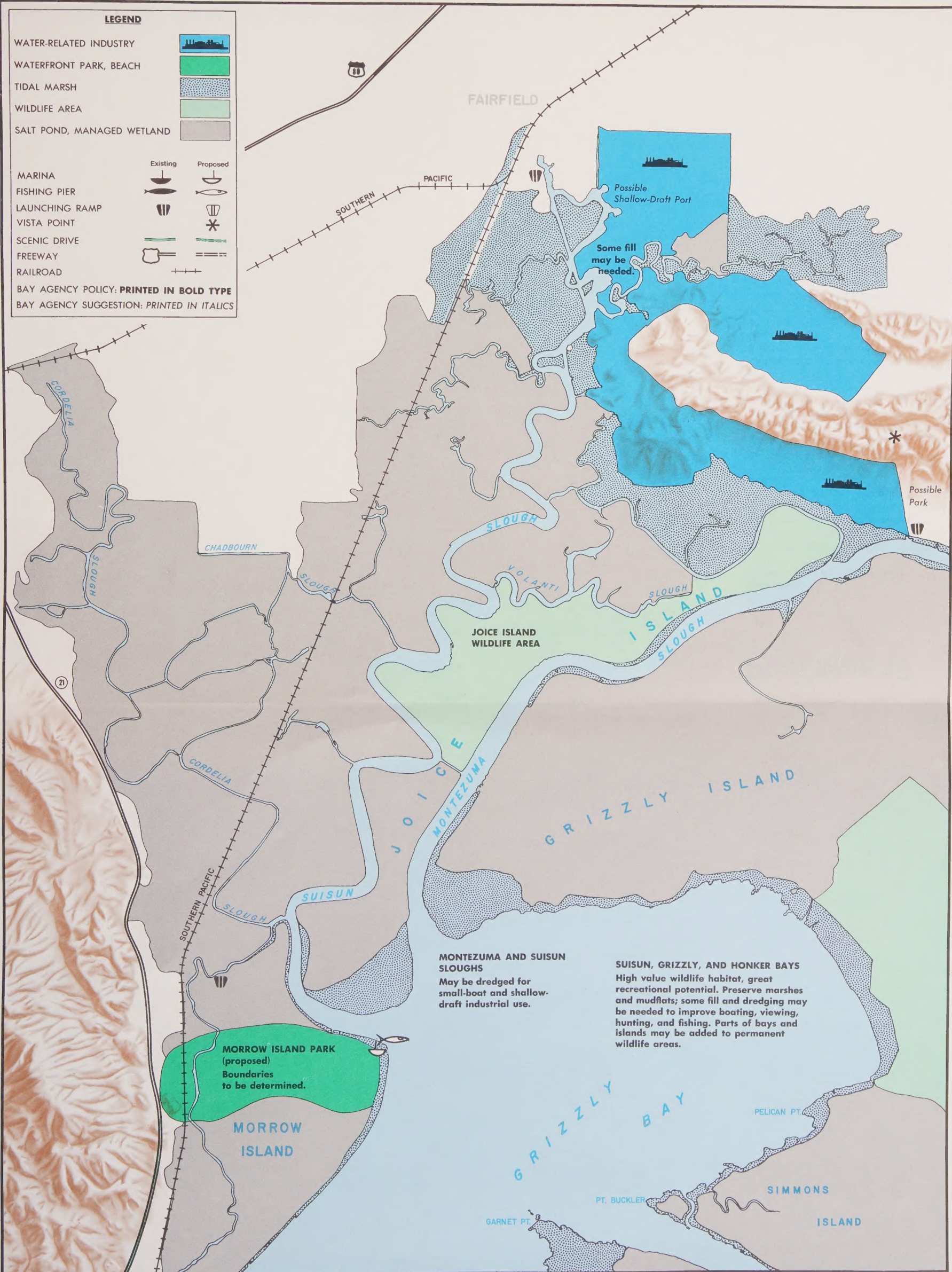
Port Chicago Naval Weapons Station. Plan maps indicate recommended use for Bayfront military installations *if* one or more of these bases is ever declared surplus by the military. The Bay Plan does not advocate the closing of any military installation.

Plan Map 18

Notes to Plan Map 18 Grizzly Bay

Suisun Marsh. Thousands of acres of controlled marshes are maintained by duck-hunting clubs as wildfowl habitat. Areas are diked, but dikes are opened for periodic flooding. Suisun Soil Conservation District protects and enhances marshland areas.





Plan Map 19

Notes to Plan Map 19 Honker Bay to Collinsville

Recreational Potential. Extensive, valuable recreational potential in river and island areas (e.g., Sherman Island—"Sherman Lake" area popular for boating, fishing). Recreational use should be encouraged.

Collinsville Area. The Collinsville-Montezuma Slough area is adjacent to the deep-water shipping channel, has rail service, and consists of flat land. It is one of the largest available sites anywhere in the Bay Area for water-related industry. The shoreline fronting on the main shipping channel is limited, however, and this relatively small frontage should be carefully planned and shared for maximum industrial development. The northern portion of the site has development potential for water-oriented industries that could be serviced by shallow-draft vessels using Montezuma Slough (an example of the growing interest in shallow-draft ports is the lighter-aboard-ship (LASH) concept of ocean shipping that has recently been inaugurated).

GENERAL DEVELOPMENT GUIDE

shoreline



outward



inward



straight

a

LAND PROJECTING INTO THE BAY PROVIDES RADIAL WATER VIEWS, CUL-DE-SAC CIRCULATION, AND, IN STEEPER SLOPES, DEVELOPS OVERLOOKS AND THE SENSATION OF BEING THRUST INTO SPACE. DEVELOPMENT SHOULD PROTECT AND ENHANCE THESE QUALITIES.

b

INWARDLY FOCUSED, THIS PLAN FORM PROVIDES A SECONDARY OR TRANSITIONAL WATER BODY AS A FOREGROUND TO THE BAY. IT PROVIDES USEFUL WIND AND CURRENT PROTECTION IN CERTAIN LOCATIONS. RIDGE LINES OF THE ENCLOSING LAND OFTEN CREATE A BOWL, HENCE AN IDENTIFIABLE GEOGRAPHIC AND DESIGN ENTITY (MARTINEZ, HURRICANE CULCH, SAUSALITO; HOSPITAL COVE, ANCEL ISLAND; PEACOCK GAP, MARIN). AT A COMMUNITY SCALE, THE FORM SUGGESTS A FOCUS FOR COMMUNITY LIFE AT THE BAY'S EDGE WITH CIRCULATION, DEVELOPMENT AND SIGHT LINES DIRECTED TO THE VISUAL CENTER OF THE SPACE.

c

CLEAR, DIRECTIONAL RELATION TO THE BAY, ESPECIALLY WITH STEEP SLOPES, DIRECTS VIEWS PARALLEL WITH THE WATER'S EDGE. UNLIKE PLAN FORMS "a" AND "b", THE OVERALL EVENNESS OF THE WATER'S EDGE REQUIRES THE INTRODUCTION OF ADDITIONAL ELEMENTS TO ESTABLISH A SENSE OF PLACE, ORIENTATION AND VISUAL FOCUS. PIERS, A YACHT BASIN, A NEARBY ISLAND, ARE TYPICAL FOCUSING ELEMENTS OFFERING THIS SENSE OF POSITION ON THE OTHERWISE UNBROKEN COASTAL FACE. CARE MUST BE TAKEN THAT DEVELOPMENT DOES NOT CREATE BREAKS AT VISUALLY DISTURBING POINTS, OR AT NEW POINTS COMPETITIVE WITH NATURAL BREAKS.

slope



flat

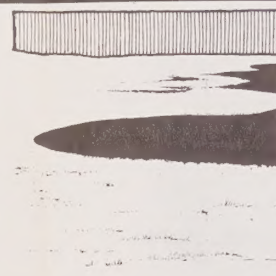
1

PHYSICAL QUALITIES: THIS LAND USUALLY HAS RELATIVELY NON-SUPPORTIVE SOILS, IS SUBJECT TO FLOODING, POOR DRAINAGE, AND OFFERS POOR ORIENTATION. IT HAS LOW ANGLE BAY VIEWS AND INLAND VIEWS ARE EASILY BLOCKED BY LOW CONSTRUCTION. EDGES ARE USUALLY WILD LIFE AREAS.

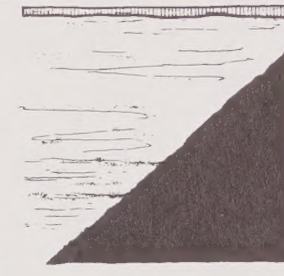
POTENTIALS: THE EDGE IS EASY TO SHAPE, CANALS AND LAGOONS ARE POSSIBLE. TALL LANDMARK STRUCTURES AT THE EDGE WOULD LOCATE AND SYMBOLIZE THE BAY'S PRESENCE FROM INLAND VIEWING POINTS. SLOUGHS, STREAMS AND WATERSHEDS COULD BE DEVELOPED FOR RECREATION TO FURTHER EMPHASIZE THE WATER THEME, INCREASE LAND VALUES AND STRENGTHEN ORIENTATION. ECOLOGICALLY SENSITIVE RESTORATION IS POSSIBLE IN MARSHLAND.



PROJECTION INTO THE BAY HAS LESS SIGNIFICANCE HERE THAN IN STEEPER SLOPES, SINCE LOW VISUAL ANGLES FROM THE FLATLANDS RENDER ALL SHORELINES ALMOST ALIKE. PROTRUDING POSITION OFFERS WIDEST WATER VIEWS AND SHOULD BE DESIGNED FOR MAXIMUM ENJOYMENT. AN ELEVATED POSITION AT THE REAR CENTER OF THIS LAND FORM ALLOWS A SENSE OF THE PENINSULA AS A UNIT AND, IF SMALL IN AREA, PROVIDES FOREGROUND CONTRAST TO THE BAY. CUL DE SAC CIRCULATION IS IMPLIED BY PENINSULA FORM AND IS MORE EASILY CONTROLLED.



DUE TO PREVAILING WESTERLIES, THIS LAND FORM CAN OFFER NATURAL ANCHORAGE ON THE WEST AND NORTH SIDES OF THE BAY. HOWEVER, SHALLOW WATER USUALLY ADJACENT TO THIS LAND TYPE MAKES DREDGING NECESSARY BEFORE BEST BOATING IS POSSIBLE. THIS PRODUCES A SCARCITY OF BOAT HARBORS, ESPECIALLY IN THE SOUTH BAY WHERE POPULATION PRESSURE AND NEED FOR BOATING FACILITIES IS GREAT. WHERE CONSERVATION IS NOT OF PRIME IMPORTANCE, DEVELOPMENT OF THIS FORM TYPE, IN MARINE HOUSING AND RECREATION, OR EVEN IN CIVIC USES SHOULD BE STUDIED.



ONE OF THE LEAST PHYSICALLY INTERESTING SHORELINE CONDITIONS - DEVELOPMENT CAN PROVIDE FOCI AND VISUAL STIMULATION; ELEVATED VIEWING POSITIONS AND LANDMARKS COULD AID ORIENTATION. CLUSTER DEVELOPMENT WOULD RETAIN BAY VIEWS FROM INLAND AREAS AND MARSHLAND PRESERVATION WILL HELP MAINTAIN BIOLOGICAL BALANCE. WHEN DIKING IS REQUIRED PROVISION SHOULD BE MADE FOR PEDESTRIAN OVERLOOKS SO THAT THE BAY IS NOT HIDDEN BEHIND DIKES. IN NO OTHER LAND CONDITION ARE HIGH VOLTAGE DISTRIBUTION ROUTES MORE VISUALLY DISTURBING (WEST AND EAST SIDES OF THE SOUTH BAY) DUE TO THE ABSENCE OF OTHER CONSTRUCTION. ALTERNATE ROUTES FOR THESE LINES GROUPED WITH TRANSPORTATION EASEMENTS SHOULD BE CONSIDERED.



0-5%

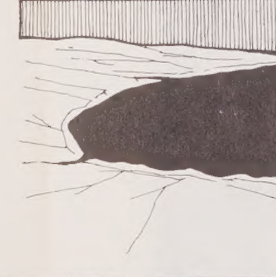
2

PHYSICAL QUALITIES: CHARACTERIZED BY GENTLE SLOPES, SOON DEGRADED, EASILY DEVELOPABLE. LOW BAY VIEW ANGLES EASILY BLOCKED BY BUILDINGS. WHERE DEVELOPED, HIGH DENSITIES ARE USUAL, PRODUCING LOSS OF BAY ORIENTATION, SENSE OF THE BAY AND VIEWS.

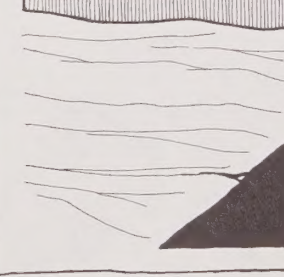
POTENTIALS: LOW SITE DEVELOPMENT COSTS, EASY CIRCULATION; CLUSTER DEVELOPMENT WOULD PRESERVE VIEWS, MAINTAIN SENSE OF BAY AS OPEN SPACE. PUBLIC VISTA POINTS, AND RIGHT-OF-WAY ALIGNMENTS SHOULD BE POSITIONED TO RESTORE VISUAL ACCESS.



THE PROJECTING FORM INCREASES THE WATER EDGE AND BRINGS IT CLOSER TO DEVELOPMENT THAN OTHER PLAN TYPES. SAN FRANCISCO'S DOWNTOWN RADIAL VIEWS ARE EXEMPLARY. ALTHOUGH PIERS BLOCK VIEWS ON LAND SLOPES 1 AND 2, SWEEPING BAY VIEW POINTS ARE POSSIBLE FOR EXAMPLE ON THE NORTHERN WATERFRONT (FOOT OF FRANKLIN IN PORT MASON), IF PUBLIC ACCESS WERE ALLOWED BEYOND THE PIERS. THIS IS TRUE IN OTHER BAY COMMUNITIES BUILT ON LAND FORM "a".



THIS IS PERHAPS THE IDEAL SLOPE AND LAND FORM TO PROVIDE A WATER FOCUS FOR DENSE URBAN COMMERCIAL DEVELOPMENT. IT NEEDS ADJOINING LAND AREA BEYOND THE BAY EDGE, AND SUFFICIENT DEPTH FOR SHIPPING. NO SINGLE LOCATION IN THE STUDY QUALIFIES AS AN EXAMPLE, ALTHOUGH PERHAPS MARTINEZ COMES CLOSEST. THERE ARE SMALLER SCALE EXAMPLES ON STEEPER LAND IN 2c BELOW.



THIS LAND-WATER EDGE RELATIONSHIP IS CHARACTERISTIC OF MANY PORTIONS OF THE SOUTH BAY WHERE HEAVY URBANIZATION CONTINUES. BLOCKAGE OF UPRIIL VIEWS BY SHORELINE DEVELOPMENT WILL REDUCE THE ABILITY OF THE BAY TO PROVIDE VISUAL EXTENSION OF SPACE. CLUSTER DEVELOPMENT COULD MAINTAIN THIS BAY FUNCTION.

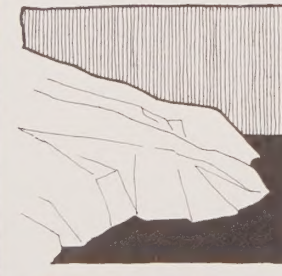


5-30%

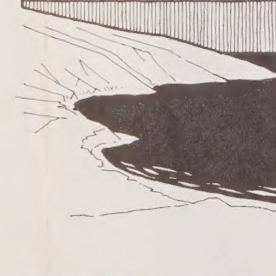
3

PHYSICAL QUALITIES: SLOPES ARE LESS SUITABLE FOR INDUSTRIAL AND AGRICULTURAL USES UNLESS TERRACED, AND INHIBIT WALKING AND BULK HAULING. WHERE DEVELOPED, STEEPED BUILDING AND UNIFORM BUILDING HEIGHTS HAVE RETAINED VIEWS. UPPER SLOPES PROVIDE GOOD COMPREHENSION OF BAY FORM AND VIEWS TO OPPOSITE SHORE.

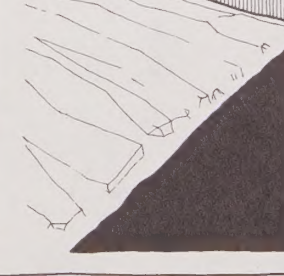
POTENTIALS: GOOD FOR RESIDENTIAL, LIGHT COMMERCIAL AND RECREATIONAL USES; HIGHER BUILDINGS ON HIGHER SLOPES INCREASE VIEWER POTENTIAL AND EMPHASIZE SLOPE; HIGH VISTA POINTS SHOULD BE PROVIDED PARTICULARLY ALONG ROADS PARALLEL TO THE COASTLINE. ROUTES AT RIGHT ANGLES TO COASTLINE WOULD PROVIDE FRAMED VIEWS AS IN SAN FRANCISCO.



RESIDENTIAL COMMUNITIES, LIKE BRISBANE, BERKELEY, OR SAUSALITO, DEMONSTRATE THE CAPACITY OF THIS LAND TO STACK LOW DENSITY, RESIDENTIAL DEVELOPMENT, WHILE MAINTAINING VIEWS AND A STRONG SENSE OF THE BAY'S PRESENCE. URBAN DENSITIES SUCH AS TELEGRAPH OR POTRERO HILL ARE EQUALLY POSSIBLE, IF HEIGHTS ARE CONTROLLED. ALTHOUGH SPECIALIZED TRANSPORTATION IN THE STEEPER SLOPES IS NEEDED, ALBANY HILL AND THE COYOTE HILLS PRESENT SIMILAR OPPORTUNITIES, ALTHOUGH THEY MAY BE MORE IMPORTANT AS PUBLIC OPEN SPACE.



EASY VISIBILITY OF RIDGE LINES AND WATER IN THIS SLOPE RANGE STRENGTHENS THE SENSE OF A COMMUNITY WHEN DEVELOPED. WATER ACTIVITY PROVIDES A SPECTACLE AS IN AN AMPHITHEATER. BAY EDGE FORM ENCLOSING THE FOREGROUND VIEW IS HIGHLY VISIBLE FROM MOST POSITIONS UNLESS LOCAL TOPOGRAPHY IS VERY IRREGULAR. DUE TO THE FOCUS ON THE COVE FORMED, CIRCULATION ALONG THE WATER'S EDGE MUST NOT BECOME A BARRIER BETWEEN LAND AND WATER. HIGH SPEED TRANSPORTATION SHOULD BE FROM ABOVE AND BEHIND TO PRESERVE SMALL SCALE EDGE RELATIONSHIPS.



COMMENTS IN 2c ABOVE APPLY IN THIS CATEGORY UP TO 10% SLOPES. SEE ALSO GENERAL NOTES IN "c" ABOVE.

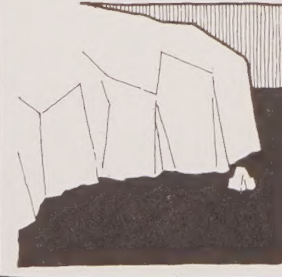


over 30%

4

PHYSICAL QUALITIES: VEHICULAR ACCESS DIFFICULT, DEVELOPMENT COSTS HIGH. MANY OF MOST DRAMATIC VIEWS ARE FROM THESE AREAS, ESPECIALLY WHERE ANGLE APPROACHES 90 DEGREES (GOLDEN GATE, POINT RICHMOND, CARQUINEZ STRAITS). LARGE WATER AREA ENCOMPASSED BY VIEW EMPHASIZE BAY FORM.

POTENTIALS: PARTICULARLY SUITABLE FOR CONSERVATION AND PUBLIC VIEWING POINTS ESPECIALLY IN PLAN FORM "a". (SEE MAP "PLEASURE DRIVES AND REGIONAL OVERLOOKS WITH SIGNIFICANT BAY VIEWS"). USE OF FUNICULARS, AERIAL TRAMWAYS, ETC., RESIDENTIAL ACTIVITY AND SELECTED COMMERCIAL USES MAY BE POSSIBLE.



DRAMATIC RELATIONSHIPS WITH THE BAY AND DISTANT SHORE, AND SUBSTANTIALLY BROADER VIEWS THAN ANY OTHER LAND TYPE, TEND TO MAKE THIS TYPE OF SITUATION A PHYSICAL AND PSYCHOLOGICAL PART OF THE WHOLE REGION. VIEW PROMONTORIES SUCH AS WOLFPACK RIDGE, PORTIONS OF POINT RICHMOND, MTS. DIABLO AND TAMALPAIS ARE TYPICAL, AND SHOULD BE PERMANENTLY AVAILABLE TO THE PUBLIC. OPEN WINDY AND EXPOSED WHERE DEVELOPMENT HAS OCCURRED, IT MAY BE INCONSEQUENTIAL IN SCALE OR PRODUCE DISTURBING FORMS ON THE SKYLINE (RADAR DOWNS ON GOLDEN GATE HEADLANDS, TRANSMISSION LINES ON SAN BRUNO MOUNTAIN).



COVE FORM DEVELOPED IN THIS SLOPE CATEGORY IS LESS LIKELY TO PRODUCE BAY VIEW DEVELOPMENT DUE TO THE PRECIPITOUS SLOPE TO THE WATER AND EXPENSIVE SERVICE AND ACCESS PROBLEMS. CONTINUOUS URBAN DEVELOPMENT ALONG THE RIDGE CAN BLOCK ACCESS TO VIEWS FOR LAND BEHIND (AS IN PLATLAND TYPES) DEVELOPS WIND AND CURRENT PROTECTION (AS IN THE EAST SIDE OF PT. BONITA) AND IS USUALLY ACCOMPANIED BY DEEP WATER.



THIS FORM OCCURS RARELY IN THE BAY REGION BUT, WHERE THE BAY PASSES THROUGH THE COASTAL RIDGE LINES (GOLDEN GATE AND CARQUINEZ STRAITS), PARALLEL CLIFFS ACCELERATE CURRENTS AND PRODUCE WIND AND WEATHER EXTREMES. THE STRONGLY-FORMED SPACE PROVIDES WALLS AGAINST WHICH THE APPARENT MOTION OF SHIPS IS HEIGHTENED. THIS LAND IS THEREFORE ASSOCIATED WITH THE MOST DRAMATIC AND DYNAMIC PORTIONS OF THE BAY REGION GEOGRAPHY, AND NEEDS PROTECTION BY WELL PLANNED CONSERVATION PROGRAMS.

Example: Development guides for sites along a cove, having a 0-5% slope, are found at the intersection of slope band 2 and shoreline band b



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